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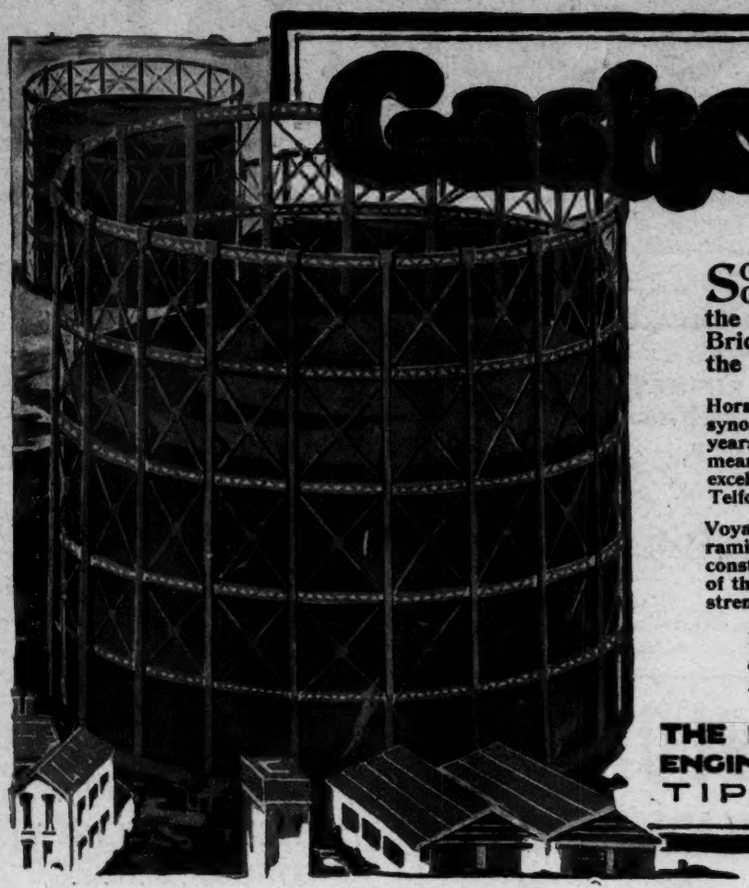

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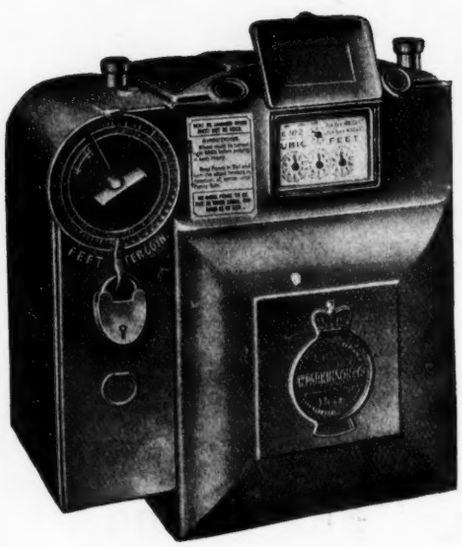

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VOL. CLXXIII., No. 3271.] WEDNESDAY, JANUARY 20, 1926. [78TH YEAR.

EDITORIAL NOTES.

Government Electricity Plans and Expectations.

THE promised speech of the Prime Minister on the electrical plans of the Government was made in Birmingham last Friday. The electricity, gas, and other industries of the country have been waiting agog to learn what the Government were going to suggest; and the revelation—true, in merely adumbrated form—is that it is nothing more than had been anticipated. It is simply the present work of the Electricity Commissioners inflated to something of a more grandiose order. The details (which may alter this view) have to await the Bill which will be introduced shortly into Parliament; but we have now the outlines, which disclose something vague, amorphous, indefinite, speculative—something which, if it, after its infliction of a heavy capital expenditure, does not give in result all that is expected of it, will impose on the country one of the most gigantic white elephants that has ever been produced. The Government have tried to avoid this by the inquiries they have made. Whether they have succeeded can only be determined by time. But already doubts are finding expression; for precisely what they are proposing to realize by radical and drastic change could be achieved by the perhaps slower—but equally effective—evolution which would have ensued from the work of the Electricity Commissioners. Government interference may for many years not reduce the cost of electricity supply in this country, but may actually enhance it; and normal movement through the electricity industry as at present existing might have been of greater ultimate advantage.

Let us examine the proposals as divulged by the speech of the Premier. In the first place, it is contemplated that an Executive Authority shall be set-up, with powers governing the whole country for the purpose of linking-up, over large areas, the most powerful of the existing modern stations and others which are to be created. Mr. Baldwin tells us this will not be a Government Department, but a Board (composed of practical men closely acquainted with the industry) on similar lines to the Port of London Authority or the Mersey Docks and Harbour Board. Despite the assurance of the Premier, this is the beginning of Government interference. The very scheme itself is an interference with the natural development of the industry. If it is not direct State control, it is State-created control by a central body, who will be in close contact with the Government, and must be when we consider the statements of the Prime Minister regarding finance. On the one hand, in this respect, Mr. Baldwin says that the new Board will raise their own capital, and will work on ordinary commercial lines—any surplus, after repayment of interest and sinking fund, being returned in reduced charges. Even the standardization which is one of the main objects of the scheme will be carried out at the cost of the Board; and the expenditure, it is expected, will be more than covered by economies in generation. The "expectations" in the speech strike one very forcibly; the tangibility or proof is not anywhere obvious. The pure vagueness of the whole matter is very much on the lines of the information given in the prospectuses of promoters of companies of highly doubtful soundness. And this is accentuated when, on the other hand, we find the Premier, after what he had said as to the new Board financing themselves and economies covering the standardization expenditure, stating that it is not anticipated that any Government subsidy will be required, but that the undertaking in its early years will be backed by a Government guarantee under the Trade Facilities Act. In other words, there is no promise there shall not be a subsidy if anticipations fail, as they may do; and there is a promise as to backing under the Trade Facilities Act. Thus the nation will anyway be called upon to shoulder some measure of financial liability. But we may be told to consider the prediction of the Premier as to the saving to the country of many millions. That is another political expectation. It is on a level with all else. The Premier is no more certain about those millions than he is that, through the interference of the Government, there will not have to be a subsidy to the electricity industry, in addition to the backing under the Trade Facilities Act. There is something very illogical about it all; and the Government are unfortunately in this matter the willing victims of visionaries, because current political conditions require something spectacular to present to the country.

The Premier had much to say about the parochial conditions and limitations of the electricity industry as it at present exists. He does not seem to realize that what is now being proposed means going from the one extreme to the other in respect of limitations. It is going to divest the industry of a large amount of the freedom and autonomy it at present possesses. He tells us that the Executive Authority, with pendant District Boards, will be absolute in all matters of generation throughout the length and breadth of the land. That means restriction on a mammoth scale. We can imagine many electricity men will shudder at the thought of the industry being permanently anchored-down to the decisions of the Authority, and for years to stereotyped generation throughout the land. No other industry in the country has been placed under similar conditions, and yet has prospered and developed with the times. Individuality in the main part of the industry is to be wholly wiped-out; and the industry is to be tied for the supply of its one commodity to the determinations of a single body, and to the set types of plant which will be ultimately accumulated in (so it is suggested) sixty stations throughout the land. It will all take time; but in the years to come, the technical men of the industry will be divided into a few generating engineers, and many parochial distributing engineers and business developers. The future of the industry is full of interest.

As the Executive Authority settle into their work, and as the superb super-stations grow, inter-connecting lines will be constructed, so that inefficient stations will be closed and for their districts supplies will be obtained from the new Authority at, it is hoped, a "reduced" rate. That again is merely an expectation. It does not appear that the Board will take over the management of present stations. We read that the existing stations will be managed as at present; but the owners will work together under the new Authority for the production of a common supply of electricity, which the Board will purchase and

make available to all distributors. This is a loose arrangement, and introduces some amount of complication. We suggest that a real technical scheme has not yet been under consideration, and that what has been considered is purely superficial and hypothetical. The object of the plans is the cheapening of electricity; and this is what Mr. Baldwin says on the point: "In itself cheaper power "will not revive industry. Manufacturing costs in power "are but a small proportion of the total costs. What we "have to look at is this: Consider the total expenditure "of the country on electricity, whether for light or power, "and consider the savings that might be made over the "whole of the consumers if the source of that light and "power can be materially cheapened." We might say the same of any commodity required by the community. It might be said of heat, clothes, food, and so forth, and particularly of coal. Emptiness of argument and insecurity are the features of the Premier's presentment of the case for the intervention of the Government into the affairs of the electricity industry. He stated that last year 42 stations were responsible for more than half the total output of electricity, and the remaining 542 dealt with less than half; and sixty stations would eventually supplant the whole of the 584 existing ones. The consumption of fuel now varies from 1·8 lbs. in the best stations to 8 or even 10 lbs. in the most inefficient ones. Then at the present time the cost per unit, exclusive of capital charges, varies from 0·44d. to 10d. and 11d. per unit. Mr. Baldwin confesses that it is upon this fact that the Government have based their proposals. Perhaps he will tell the country whether or not the 0·44d. is for fuel alone (and not the total of the generating costs) in a single well-circumstanced station.

However, this fact stands out clearly from what has just been said: That more than half the electricity used in this country is already being supplied (without the intervention of the Government) at the standard cost at which they are aiming. The stations that are doing this are in the densest electricity consuming areas, through the concentration in them of our largest industries; and somewhat less than half of the electricity supplied in the country is scattered over its length and breadth. Communities and electricity use cannot be concentrated; and therefore the electricity must be carried to them. As the cost of electricity transformation and transmission is high, the difference between the cost of generation in the best stations and the inferior ones must be heavily discounted by the transmission costs which the scheme will impose. It is a question whether in the bulk of cases the transmission costs will not wholly annihilate the advantages of which the Government are dreaming. If this is so, then whence are coming the millions of savings of which the Premier spoke? It is further noticed that the Government are contemplating that the margin of plant required for safety will be reduced by concentration of generation. Wherever situated, the margin of plant cannot be reduced below that needed for flights in demand, which might at times conceivably synchronize throughout the land. Then there is to be compulsory standardization of frequency at 50 cycles per second. This, again, it is supposed will be productive of benefit, which various electrical engineers doubt. The Prime Minister also spoke of the reduction of the many different pressures now in use to not more than three. With such a change, there will have to be a good deal of overhauling of consuming apparatus.

The expectation is that the concentration of generation, inter-connection of stations, standardization of frequency, *plus* the big and expensive network of transmission lines, will have many advantages, which will make the changes highly remunerative for the electricity industry, while the community and industry will have cheaper electricity for power, heat, and light. The resulting increased consumption, it is believed, will cause the use of electricity within the next fifteen years to average 500 units per head per annum, instead of the 200 units or so which constitute the present average. Furthermore, the scheme will provide work in the electrical plant industry and the allied metal trades. These, in our opinion, will be the greatest beneficiaries—in fact, certain gentlemen associated prominently with the electrical plant manufacturing interests have already given vent to their admiration of the scheme in the ears of newspaper representatives. But the Premier utters a warning. All these benefits will not accrue immediately. There must be a transition period. During that period (which will be long), will all this work be a drag upon the electricity industry or otherwise? The speech of the Prime Minister, coming after all the secret work of the Committees who have advised the Government, has done more than anything else to divulge the hypothetical character of the advantages to be derived from a scheme the technical and financial details of which have not yet been fathomed. Deprived of definite fundamentals, we have nothing but expectation. Indeed, there is no proof that better results from now onwards would not be obtained, at less capital cost, by the normal development of the present electricity supply system.

Since the foregoing was written, additional information has obtained circulation. It is stated that the Government Bill will consist of thirty clauses and three schedules, which will, it is believed, give abundant ground for discussion, although it is desired that the measure or scheme should not be regarded as a party one. It is thought probable that the Executive Board will consist of about seven members, and, in view of the Government financial guarantee, include a representative of the Treasury. It is computed that the Board will find it necessary to raise some £35,000,000 during the next seven or ten years; and there is confidence that the public will be very willing to subscribe some £5,000,000 a year for the purpose. It is understood that, in the case of rebellious owners of large modern plants who decline to co-operate, the Board will have power to acquire their stations compulsorily. Regarding the smaller stations, the Board will be in the position, should there be any trouble, to ensure that the consumers are not deprived of the hoped-for cheaper electricity. Thus it seems that the Bill is intended to abrogate a considerable part of the powers conferred upon the present electricity undertakings without as much as permission or an apology for doing so. It is the impression that it will take ten years or more before the country is in possession of a complete standardized or inter-connected electricity system.

"Looking Forward" Policy and Propaganda.

It has been impossible lately to take up a daily or evening newspaper, London or provincial, without seeing some reference in it to the Government electricity scheme. Whoever is responsible for the articles—whether due to Government publicity or to electricity industry propaganda—deserves credit for a high standard of knowledge of how to serve up information popularly, and for being opportune in the work of publicity. The object may only be to pave the way for the Government scheme winning a strong place in public favour, or it may be that it is regarded as a favourable time for doing something more in creating an atmosphere highly charged with electricity. A curious thing is that the editors of the daily and weekly papers do not appear to be at all averse to this constant iteration and reiteration concerning electricity; and we feel pretty confident that this is not altogether due to any idea in the editorial sanctums that electricity development is a subject of peculiar charm for the public. However, the reason for the Press accommodation that electricity is securing is a small matter; the important fact is that it is obtaining it, with the Government in the background, on almost spectacular lines. This, in our opinion and that of other men in the industry, makes the time especially opportune for all the gas propaganda the industry can undertake, both of the national and local order. We have noticed the recent advertisements of the "B.C.G.A." They are good; but if we could have more popularly written articles published in the newspapers, they would be widely read, and would meet the public taste, particularly if they dealt with the national economy underlying the work of the gas industry, and the issue of it in economy to the individual and to industry. At the same time, we again insist that the gas industry needs a well-defined and high standard scheme of policy which would meet the new circumstances—present and developing, and which could be applied by gas undertakings from

North to South and from East to West. This was a matter which was touched upon in our first editorial article last week. We then urged, and again do so, that the industry should make a deliberate attempt, through properly ordered investigation into all parts of its operations, to develop a policy which, if generally applied, would do much to elevate the resisting power of the industry against even Government-backed competition. We know the industry has a large inherent potentiality which has not been adequately or universally cultivated. The excuse is generally that of cost. The cost of loss of business is frequently greater than that of ensuring its retention and promotion. On this point as well as that of propaganda, there is no reflection upon our active central organizations. It was a good thing for the gas industry that the newer ones—the National Gas Council, the "B.C.G.A.," and the Society of British Gas Industries—came into existence when they did. They have all, in their different spheres and co-operatively, rendered to the industry signal service, without which we should have been in a far different position from that which we occupy to-day. But, with new developments about us, we know that some quarters of the gas industry are watching for signs that our organizations are, in addition to dealing with current matters, looking forward.

A Combined Coal and Power Industry.

THROUGH the Royal Commission on the Coal Industry, a Joint Committee of the Miners' Federation, the General Council of the Trade Union Congress, the Executive Committee of the Labour Party, and the Executive Committee of the Parliamentary Labour Party have presented to the country a scheme for the public ownership and working of the coal, power, and transport resources of the country. The scheme is revolutionary, visionary, and technically and financially impossible. The only new thing about it is that it assembles into one a number of ideas that have had separate existence for several decades, but one after the other have been rejected as technically or economically unfeasible, and so nothing has ever come of them. The gist of the scheme is given in these words: "The coal industry should become an organization for "mining coal, manufacturing electrical power on a very "large scale, making both coke and smokeless fuel, and "producing, in addition, gas, fuel oils, ammonium com-"pounds, chemical base materials from tars, and other "bye-products. This transformed industry should be "nationally owned." The scheme, if practicable, could only apply to the distant future; and it does not in any way assist in the solution of the pressing problem as to what shall be done to improve the present economic state of the coal industry. The Miners' Federation have no scheme to enable the achievement of early improvement. They acknowledge that their brains are inadequate to the devising of anything to alleviate matters at the present juncture. They admit the growth of competition and the reduced requirements of foreign countries for our coal, owing to their cheaper home-produced coal, water-power resources, and the use of oil. But they do not acknowledge that British miners can contribute anything to the reduction of the cost of production per ton by putting in an additional hour per day, nor are they ready to confess that the industry is over-manned at the present time.

All that has been done by the Miners' Federation and their allies is to put forward a skeleton scheme for the future, without understanding any of its material and technical realities, and what it would involve in the way of finance and a congestion of industries and population in the coal areas of the country, near to where their wonderful power-producing plants would be erected. To the extent that this congestion occurred, there would be industrial impoverishment of large tracts of the country. It is clear also that the authors of this fantastic scheme know nothing whatever of the costs and losses of the transmission of gas and electricity and other products to the centres where they are required, as compared with the costs of transporting coal, and dealing with it where the products are needed. However, we see that Mr. R. H. Tawney, Lecturer on Economics, who gave evidence before the Coal Commission last week on behalf of the Miners' Federation, stated that there is no intention at present to nationalize privately owned electrical and other undertakings, but what is wanted is that the coal industry shall be free to establish power-producing plants—apparently the idea being to improve the position of the coal industry by robbing other established industries of their legitimate means of development, which does not strike us as being good economics. To put the proposals another way, the Miners' Federation and their coadjutors believe that, in order to make the coal industry economically independent, efficient, and prosperous, it should be transformed from a purely coal-extracting industry to an increasingly coal-utilizing one.

Turning to the outline of the ambitious scheme, in the first place it proposes that the ownership of minerals and collieries should be acquired by the State. There is a difference of opinion as to the terms on which the ownership of the minerals should be taken over; but the Miners' Federation (separating them from their colleagues) are opposed to the principle of compensation for mineral royalties. There appears to be agreement, however, that the acquisition of the collieries should be based on actual market values; and there should be issued to the vendors such an amount of Government stock as would, if sold at current market prices, produce a sum equal to the value of the property. The scheme, it is considered, is altogether too large to be entrusted to any but a public body, which indicates the view that, without the backing of the National Exchequer, the project could not hold together. A tremendous organization is proposed, headed by a Power and Transport Commission, with satellites which would be known as the National Coal and Power Production Council, Provincial Councils, Pit and Works Committees, Consumers' Council, and a Special Compensation Commission. No useful purpose would be served by a full examination of the composition and functions of these various bodies. A few points, however, may be referred to. It is observed that the premier Power and Transport Commission would consist of six full-time Commissioners—representing expert knowledge on (*a*) coal, (*b*) electricity, (*c*) gas, (*d*) transport, (*e*) commercial questions, (*f*) labour matters—and a Chairman. The Commission would be called upon to survey the problems of power and transport development as regards both needs and possibilities; to undertake and administer the inter-connection of generating stations and the trunk line transmission of power; to lay down conditions governing power and transport undertakings, both public and private; to co-operate with the Department of Industrial and Scientific Research in the promotion of research into power production and coal bye-products and kindred questions; and to undertake or to arrange for the commercial application of the results of research into power and transport problems. In addition to exercising these functions, the Commission would form the final authority determining the larger questions of policy relating to the coal industry.

We are pleased to see the important place which the authors give to research and the application of the results. We are also interested in one feature of the duties of the National Coal and Power Production Council, who would function in much the same way as a board of directors. They would be charged with the duty of supervising all the internal affairs of the enlarged industry, of securing the use of the most efficient methods of producing and treating coal, and of seeing that material of the necessary quantity and kind was provided. We hope this is a confession that the Miners' Federation are aware that the "kind" of coal that has been produced of late years has left much to be desired in the way of greater cleanliness in respect of incombustible content. It is also admitted by the authors of the report that to produce power and heat by burning raw coal is grossly wasteful and unhygienic. But they are unable to see farther than electricity and low-temperature carbonization—to them there is nothing beyond more economical for the production of heating agents. They have much to learn before they can become really constructive in this matter. We will leave the scheme there, as it is useless penetrating in detail into something that is both grotesque and impossible, and shows a complete ignorance of all that is technically involved.

A Minimum Sliding-Scale Dividend.

IN the Bill which the Gas Light and Coke Company are promoting in the approaching session of Parliament, they are introducing a novel proposal in connection with the sliding-scale, which will bring this method of regulating prices and dividends much nearer to the system of a basic price and dividend which originated with the South Metropolitan Gas Company, and has been adopted by certain other concerns. After the experiences during wartime and until the Gas Regulation Act was passed of miserably attenuated dividends, depreciated capital values and reputation, which contributed to the difficulties of raising money for the industry—all owing to the failure of the sliding-scale to protect gas investors, operating, as it did, severely to their disadvantage—we strongly approve, in the interests of stockholders and consumers alike, of basic dividends and of the minimum dividend which the Gas Light and Coke Company are now proposing as a less radical change. From the evil effect which the sliding-scale during the stressful years had upon gas stocks and shares, the industry has never properly recovered, as is seen by the fact that the least indication of adverse conditions sends values down to a degree unwarranted in the circumstances. Investors are highly sensitive to any cloud which may lie temporarily over the industry. The only way to correct this, so far as we can see, is by the introduction into the sliding-scale of a reasonable minimum dividend. The justice of the principle of a basic dividend has been amply acknowledged by Parliament; and there are the other excellent reasons for Parliament now agreeing to the simple innovation of the Gas Light and Coke Company—that, whenever, under existing conditions, the rate at which dividends actually payable to the holders of ordinary stock of the Company in respect of any half-year would be less than 5 p.ct. per annum, the Company or the Directors (as the case may be) may declare, and pay out of any monies available for the purpose, a dividend on the ordinary stock at a rate not exceeding 5 p.ct. per annum. That is a proposal which is politic and moderate; for the minimum would apply to times of adversity, and such times are the ones when large numbers of investors—and we have many small investors in the gas industry—require that their incomes shall not be lowered, but, if possible, increased. Anyway, an increase is impossible when the times are unfavourable; but the gas industry and the investors in it never want to see a return of the position into which they were precipitated during the war, and where they suffered so long. Nor would anybody outside the industry with a sense of justice desire that. The proposal of the Gas Light and Coke Company is a protection which it is hoped may never need to be applied. But if justification were required for introducing a minimum 5 p.ct. dividend into the sliding-scale, then the war and subsequent years provide it in overwhelming measure.

Deputations.

The Minister of Transport (Lt.-Col. Ashley) this week is receiving three deputations on the subject of the Government electricity scheme. Yesterday he met representatives of the electricity supply industry; to-morrow he will be seeing representatives of the Joint Electricity Authorities; and on Friday representatives of the gas industry. The object being free discussion and elucidation of points, the interviews will be private.

The Promoting Opportunists.

With Soame, the Baronet, as Chairman, and Captain Eliot F. Hill (Surveyor), Walter Thompson (the Solicitor to several of the 43, Cannon Street promotions), C. E. P. Groth, and Major James Brigden (the Civil Engineer and Technical Adviser) as his colleagues on the Board, and Turner, the well-known Auditor to 43, Cannon Street Companies, serving in his old capacity, the Electric Light and Power Contracts Finance Corporation, Ltd., has been launched. In prominent type on the face of the prospectus appears "General Electric," and underneath in smaller type "Contractors." The General Electric Company should be mightily pleased. The concern is floated simultaneously with the Premier's Birmingham speech, which shows how watchful 43, Cannon Street is for opportunities. The Registered Offices of the Company, by the way, are at County Chambers, Corporation Street, Birmingham. Many thousands of pounds of capital—debentures, preference shares, and participating premium notes—are required for the luxuriant business these people are hoping to do. We will deal with points in the prospectus in our next issue. Meanwhile, it is hoped that no gas investors will drop good money in the maw of this promoting crowd, which appears to have somewhat extended its following.

Road Tar Specification.

It will be seen from the minutes of the Central Executive Board of the National Gas Council that the British Engineering Standards Association have invited the Council to nominate a member to serve upon the Sub-Committee of the Association which have been appointed to revise the specification for tar for road purposes. The appointment was referred to the Tar Advisory Committee.

Specification of Piping, &c.

More and more gas undertakings are obtaining statutory powers to specify the minimum size and material of gas pipes and fittings put into the houses or other premises of consumers, together with the right of inspection and the power to compel repairs of pipes and appliances which are in a dangerous condition. In the coming session of Parliament, the Chorley and Halifax Corporations will be asking to be invested with these powers.

Institution of Fuel Economy Engineers.

We learn that the first Council Meeting of this Institution was held in London at the Engineers' Club on Jan. 15, when the first list of members was submitted for the approval of the Council. The applications came from leading engineers associated with several industries, showing the great interest which the new organization has aroused, and fully confirming the beliefs of the founders that an Institution of fuel technologists was necessary for the scientific development of our fuel resources. The Council have decided, in view of the enthusiastic support which is forthcoming, to make immediate arrangements to open a London Office. In the meantime, applications should be addressed to the Secretary, Mr. H. L. Pirie, 29, Sherwin Road, Lenton, Nottingham.

In the Next Session.

There is an imposing array of Public Bills in course of preparation for the next session of Parliament; but the Government have decided to make a small selection for early presentation, as they consider it would be imprudent to overload the programme, because (according to one parliamentary correspondent) "the difficulties of the coal question are so great, and the outlook as regards a permanent settlement in the mining industry is so uncertain, the plans made now for a heavy output of legislation must be liable to dislocation a few months hence." The Bill for electricity development will also have an early place.

"T.I.C." Tar Plants.—On the recommendation of their Engineer and Manager (Mr. Alexander Gray), the Urban District Council of Ashton-in-Makerfield have placed an order with the Woodall-Duckham Companies for a "T.I.C." (lead bath) tar plant, having a capacity of 10 tons of crude tar per 24 hours. It is intended that this plant shall produce tars to the Road Board's specification.

Woodall-Duckham Vertical Retorts for Aarhus.—The Council of Aarhus, Denmark, have placed an order on behalf of their Lighting Department with the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., for an installation of vertical retorts to deal with Durham coal. The installation is to consist of five settings of four retorts, the whole having a carbonizing capacity of 140 tons of coal a day. It is to be equipped with coal handling plant from an existing coal store, and a complete coke handling plant, including screens, concrete storage hoppers, and an electrical crane working on an overhead concrete gantry for the conveyance of approximately 7000 tons of coke into an open yard storage. The order has been received by this English Company in spite of the closest home and foreign competition; three German firms and two English firms also having tendered. The value of the contract is about £72,000.

PERSONAL.

A special meeting of the Plymouth Corporation Gas Committee on Friday received and accepted the resignation of Mr. W. P. TERVET, Engineer and Manager of the Devonport Gas-Works. Mr. Tervet has been in the Corporation's service for many years.

OBITUARY.

The death took place on the 13th inst., at the age of 77, of Mr. JOHN JAMES COOKE, successively Manager of the Heckmondwike and the Ardsley Gas Companies. He was associated with the Heckmondwike undertaking for 32 years. Five years ago he retired from active work in the industry, and was almost immediately incapacitated by a seizure.

Alderman GEORGE HAYNES, of Lichfield, whose death has occurred at the age of 81, spent practically the whole of his active life in public work of one kind or another. He was the senior member of the City Council, and was Mayor for three years. He was Chairman of the Lichfield Gas Company.

FORTHCOMING ENGAGEMENTS.

Jan. 21.—MIDLAND JUNIOR GAS ASSOCIATION.—Meeting.
Jan. 21.—ILLUMINATING ENGINEERING SOCIETY.—Meeting at the Royal Society of Arts, 7 o'clock.
Jan. 22.—CHEMICAL ENGINEERING GROUP AND THE SOCIETY OF CHEMICAL INDUSTRY (LIVERPOOL SECTION).—Joint meeting at Liverpool.
Jan. 29.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Meeting at Westminster Technical Institute.
Jan. 30.—SCOTTISH JUNIOR GAS ASSOCIATION.—Visit to the Kyle Chemical Company's Works at Irvine.
Feb. 9.—NATIONAL GAS COUNCIL.—Meeting.
Feb. 9.—FEDERATION OF GAS EMPLOYERS.—Meeting.

INSTITUTION OF GAS ENGINEERS.

Feb. 9.—ADVISORY COMMITTEE ON EDUCATION.—4 o'clock.
Feb. 10.—EMERGENCY COMMITTEE.—11 o'clock.
FINANCE COMMITTEE.—12 o'clock.
COUNCIL.—2.30 p.m.

CITY AND GUILDS OF LONDON INSTITUTE.

Report on the Work of the Session, 1924-25.

It is stated in the report for the session 1924-25 of the Department of Technology of the City and Guilds of London Institute (a copy of which has been received from Mr. John Murray, of Albemarle Street, W.) that the number of candidates examined in technological subjects in Great Britain and Ireland shows a small increase; the figures being 8676, as compared with 8579 in the previous session. It is pointed out that, in view of the examinations established by the Institution of Gas Engineers, a smaller number of entries for the City and Guilds of London Institute's examinations in Gas-Works Practice and Gas Supply Practice was only to be expected; and, as a matter of fact, the decrease in these subjects amounted to 160. The price of this report is 1s., net. Copies of the programme for the school year 1925-26 (published by Mr. Murray) may be obtained from Messrs. Lamley & Co., 1 to 5, Exhibition Road, London, S.W. 7, price 3s. 6d. net, postage 5d. extra. The general regulations and all syllabuses are printed therein in full.

A number of meetings have been held of the bodies who advised the Institute in regard to (among others) gas subjects; and the scheme of examinations in minor courses in Gas-Works Practice, Gas Supply Practice, and Gasfitting, as drafted by a Sub-Committee of the Institution of Gas Engineers, has been adopted. Under this scheme, which appears in the programme for the session 1925-26, the Institute will hold only a single examination in the first two subjects, but three grades in Gasfitting. In all of these a separate paper on Elementary Science, Mathematics, and Drawing will form an integral part of the examination. This change, it is remarked, is in accordance with the general tendency of the present time to call for greater knowledge of ancillary sciences than can be shown in answers to a single question paper which deals primarily with the main technical subject.

The thanks of the Institute are tendered to those bodies who support the cause of technical education by the offer of prizes. Among these bodies are the Society of British Gas Industries, the Coke Oven Managers' Association, and the Institution of Heating and Ventilating Engineers.

It is shown by the table of results of examinations last year that the total number of candidates in Gas-Works Practice was 69; in Gas Supply Practice, 132; in Gasfitting, 158; in Coke and Bye-Products Manufacture, 22; and in Coal Tar Distillation, 14. The percentage of failures was: Gas-Works Practice, Grade I., 0, Final, 15·8; Gas Supply Practice, Grade I., 12·5, Final, 37·9; Gasfitting, Grade II., 38·9, Final, 35; Coke and Bye-Products Manufacture, Final, 27·2; and Coal Tar Distillation, Final, 14·3.

ELECTRICITY SUPPLY MEMORANDA.

Fire Offices and "Standard Practice."

THE much-condemned regulations of the Institution of Electrical Engineers for the equipment of buildings still smile sweetly upon their critics; and despite all the harsh things said about them, they continue to typify the best standard of electrical installation work. We have heard of fire insurance office men who are getting very uneasy about the many mysterious fires that are taking place in the country, to which the "cause unknown" label is affixed, but in which fusions are strongly suspect. Some ninety offices associated with the Fire Offices Committee have now broadcasted a notice stating that they approve of the 1924 edition of the Institution's Regulations for the equipment of buildings, and have adopted them as standard practice. The letter has been circulated among electricity supply undertakings, consulting and installation engineers and contractors, and architects. This looks like real business; for if the intimation means anything, it is that the Offices will not approve of electrical equipment which does not comply with the standard practice. The trouble is that probably 90 p.ct. of the electrical installations in the country do not respond to this practice; but, of course, the Fire Offices cannot make their approval and adoption retrospective, and so must shoulder the additional risks attached to equipment which is below standard practice. So for some time to come "cause unknown" must still cover a multitude of what are fairly believed to be electrical sins. "Megohm," in the "Electrical Times," thinks the Offices have lost a fine opportunity. He says that "many" old installations should be condemned and rewired, but not all. Evidently he is no believer in electric wiring that is more than ten years old, inasmuch as he says: "Had they [the Offices] announced that, in adopting the new regulations, they did not make them retrospective, except for installations more than ten years old, and that a period of a year was given to bring all other installations up to the new standard practice, useful and immediate results might have followed." "Megohm" may also have an eye upon the interests of the wiring contractors. However, if the Offices are going to make effective their adoption of the new "standard practice," they will have to be less lax than they have been in the past in ensuring that new installations are all they should be. They might also save money by weeding-out many of the menacing defectives.

Fires.

There have recently been several fires the causes of which are "unknown." The drapery stores of Messrs. Cullen Bros., of Nottingham, were gutted on Tuesday week; and the damage is estimated at several thousands of pounds. Says the impeccant reporter: "The cause of the disaster is said to have been an electrical fusing in one of the windows." York Street, Liverpool, was the scene of a fire on Monday last week. It broke out in the basement of a building occupied by Messrs. R. S. Whittaker & Co., Ltd., who are concerned in electrical supplies.

One Way Out.

Some of the propaganda articles which have been appearing in the daily Press, treating, in florid language such as meets the public taste, of the Government electricity scheme, have pictured electricity becoming so cheap, from the expenditure of many millions of capital, that it will be available for all domestic heating purposes. Electricians and other technical men know differently; the public does not. Mr. F. J. Moffett, B.A., who is a member of the Institution of Electrical Engineers, is one of those who is well aware that much that is being published is all moonshine. He has written to "The Times" on the subject of the "all-electric" house. With the first part of his submissions we are in agreement; with the second part, we are not. He says it is important to examine for what purposes the use of electricity is justified from the point of view of coal; and he proceeds to explain why this is. He remarks: "In England the bulk of the public supply of electricity is generated by steam-driven generating stations, of which the average thermal efficiency is 15 p.ct.—*i.e.*, 85 p.ct. of the heat units in the coal is lost. For the provision of light and power such a loss is justified; but for heating and hot-water supplies this is not the case." So far, we agree with Mr. Moffett. But he goes on to suggest that heat and hot-water supplies can be provided in a more efficient manner if the generating station supplies heat in the form of hot water, and electricity as a secondary product—utilizing the exhaust steam to heat water, which is then distributed through pipes suitably insulated. Mr. Moffett calculates that, with a system of this kind, the heat loss of a generating station can be reduced to 40 p.ct. So long as the result is not a financial infliction upon the ratepayers, gas undertakings could (if they studied only their own commercial interests) wish for nothing better than that electricity concerns should cripple themselves by adopting Mr. Moffett's suggestion.

The Final Test of the Super-Station.

The Electricity Commissioners are trying to make many electricity concerns which require additional plant patronize large power stations by taking from them a bulk supply; and some of these find that the price they would have to pay is above that for which they can generate locally. The position is absurd; and yet the policy—being the policy of the Commissioners—must, they hold, be served on every possible occasion, whatever the local consequences. The Barnes District Council wanted more plant; and the Commissioners preferred that they should give their custom to the Barking super-station. The Council did not feel disposed to fall in with the Commissioners' views; for they are doing better locally than they could do with a bulk supply at the price demanded. The matter was referred to at the meeting of the Council on Tuesday of last week, when a proposal was made that, after the meter readings for the March quarter, the charges for electricity should be reduced to 4d. per unit for private lighting and 2d. per unit for power, with discounts ranging up to 37½ p.ct. In moving the adoption of the recommendation, Councillor S. E. Jackson ridiculed the fundamentals of the Government scheme. To an extent, he was speaking before he knew precisely what were their modified proposals. He said that the Government had the idea that the one and only thing which could save the industries of the country was a cheap and abundant supply of electricity, subsidized by the taxpayer. What are the facts? And the critic replied that the electricity industry is to-day, without a shadow of a doubt, one of the most prosperous in the country. The concessions to be made this year to the consumers in Barnes are the equivalent of £10,000. Yet the Barnes undertaking is part of the very industry the Government had proposed to subsidize with the taxpayers' money! Mr. Jackson regarded it as pitiable that the Government of this great Empire should be reduced to "clutching at straws" in the hope of staving-off what they consider to be a disastrous condition. The country is not so full of wealth as to be able to waste 20 to 30 million pounds on an industry that is not in need of it. Then Mr. Jackson came to the desire of the Electricity Commissioners to compel the Council to take a supply of electricity from the Barking super-station. He asserted that, on an analysis of the figures submitted, it was proved that the Council would lose at least £10,000 per annum by the transaction, which shows that the super-station is not all that is claimed for it. The County of London Electricity Supply Company, Ltd., who operate the Barking station, supply on the south side of Upper Richmond Road. It is somewhat Gilbertian to find that the charge made by them is 7·15d. per unit for lighting; while on the Council's side of the road, the supply is given at 4½d., and will within three months be 4d. per unit. Surely, since it is claimed that the Company can supply cheaply, it is time they reduced their charges by at least 50 p.ct. That is the comment and suggestion of Mr. Jackson.

Further Evidence from Leigh.

Further evidence as to unsatisfactory supply from super-stations comes from Leigh. Nothing too harsh can be said in the Town Council as to the supply given by the Lancashire Electric Power Company. Breakdowns have been experienced on no fewer than thirty-seven occasions. The Corporation were compelled to take the supply; and they have to pay a higher price than they used to do. As a matter of fact, electricity can be produced at the Corporation station in Leigh at much less than they are paying the big Power Company. At a meeting of the Council on Tuesday of last week, Alderman Dobb, Chairman of the Electricity Committee, declared that the idea of the Government that a cheap and plentiful supply of electricity could be furnished by large stations is a myth. Leigh is going to try to get electricity from the cheapest and most reliable source; and they intend to fight very hard to obtain it.

Importance of the Load Factor.

The Maidstone Corporation Electricity Committee have been extending their plant; and the event has been duly celebrated—in one way by a luncheon. The Department has had good fortune in the development of the business; and the Electrical Engineer (Mr. E. E. Hoadley) is naturally very proud of it. He regards the growth as phenomenal; and he attributes his good luck to the ability to develop the load factor. He stated at the luncheon that this year the load factor would touch the remarkable figure of over 43 p.ct. Mr. Hoadley believes that the way to cheapen electricity is to flatten out the load curve as much as possible. A load factor of 43 p.ct. means a very considerable flattening out. Those people who use electricity for a great number of hours per day have always been encouraged. He says he had not been in Maidstone very long before he made up his mind to make an "attack" on the paper mills. They are difficult people to approach; but he found that, even if he gave them electricity at what it cost him, it would pay in the long run. If he makes very little profit from that source, it enables him to supply other customers much more cheaply owing to the ratio of the load. Mr. Hoadley hopes that with the new plant he will be able to knock "big chunks" off the costs.

"Assisted" Wiring.

Assisted or free-wiring of small houses has "taken on" among electricity supply undertakings. It is, of course, not a new idea. It has been talked about, but not acted upon to any considerable extent, for—shall we say?—the past twenty years. But electricity undertakings were not some years ago in the position to run risks; and the energies of their staffs were expended in getting the larger customers. But it is a question now of dipping lower in the social scale for expansion, though the business is less profitable. And really what some undertakings require is not an increase in the lighting load so much as new business in the day-time to raise the valleys of their output curve, while others, especially where there is a big industrial day load, find an addition to the lighting load a desirable thing. However, the "assisted" wiring policy is growing in application, though it is difficult to see that consumers of the class who come under such schemes can be of any material benefit, inasmuch as the business done with them individually is modest compared with the cost of the service to them, and they must economize. We have previously given instances and information concerning the growth of the system. A few more may be noticed. At Swansea the Electrical Engineer has recommended, and the Electricity Committee have adopted, a scheme whereby there is to be an extension of "free wiring" (which is not a truthful description) to all properties having a rateable value not exceeding £20 per annum. But this is contingent on not less than ten houses being supplied from one service, and that there is an agreement to pay 2d. extra per KW.-H. for the first 50 KW.-H. consumed per annum for five points; any additional points being allowed, with a *pro rata* increase in the number of KW.-H. to be paid for at the higher rate. Ordinary meter rent will be charged; and the minimum consumption is to be 10 KW.-H. per point per annum. The Heckmondwike District Council are angling for small consumers by offering to wire houses on a charge of 1d. per KW.-H. in excess of the ordinary charge per unit. At Eastbourne, the Borough Electrical Engineer reports that of the last contract for wiring 200 houses, 127 have been dealt with, and a further 72 applications have been received. The Electricity Committee have decided that the present contract shall be renewed to cover a further 400 houses. The Horsham District Council have been considering the question of wiring premises for electric lighting; and the suggestion is that a rental of 3d. per point per week shall be charged. An application is to be made to the Electricity Commissioners for a loan of £1000 to cover the estimated cost of the scheme. Most of these assisted wiring schemes stop at lighting; to go beyond means assisted uneconomy.

A Century of Lighting.—Much interest has been taken in the book by M. Eg. Adry, of Antwerp, entitled "Un Siècle d'Eclairage," which was reviewed in the "JOURNAL" for Dec. 23 and 30. M. Adry asks us to announce that anyone wishing to procure a copy of the volume can do so by writing to the Librairie de l'Anversois, 30, Marché aux Œufs, Antwerp, enclosing frs. 15, or its equivalent 3s.

Dehydration of Tar.—In a recent German patent (No. 406,658) tar containing water is treated with a sufficient quantity of a neutral salt, such as magnesium chloride, magnesium nitrate, ammonium nitrate, excluding calcium chloride, to form a moderately concentrated solution with the water present. The whole is stirred mechanically at about 70° C., and when agitation is stopped rapid separation of the mixture into a top layer of dehydrated tar and a lower layer of salt solution follows.

Baths and Brighter Railway Stations.—Many railway stations are equipped with bathrooms, dressing-rooms, and shaving saloons with a constant supply of boiling hot water. At the Charing Cross and Cannon Street Stations of the Southern Railway, for example, 240 gallons of high-temperature water are always kept ready for travellers. At Liverpool Street Station, again, no fewer than seventeen powerful water-heaters are in daily use for providing hot water for bathing, washing, shampooing, catering, and other purposes. The same story could be told of the equipment at other large railway stations. The interesting point about these installations is that, in spite of the fact that the railway companies can obviously obtain coal at a low cost, they nearly all use modern gas water-heating plant. Particulars and photographs of a number of these installations are contained in the current issue (No. 142) of the "B.C.G.A." publication, "A Thousand-and-One Uses for Gas."

NATIONAL GAS COUNCIL.

Meeting of the Central Executive Board.

The Central Executive Board of the National Gas Council met on the 12th inst., at 28, Grosvenor Gardens, London, S.W.—Mr. D. MILNE WATSON presiding.

ELECTRICITY.

The proposed Government Bill dealing with the electricity industry was discussed by the Board, and it was indicated that the Council were taking every possible step to protect the interests of the gas industry in connection with this matter.

PARLIAMENTARY.

(*a*) *Special Orders under Section* 10.—Discussion took place with regard to the parliamentary procedure in connection with Special Orders under section 10. The attention of the Board was drawn to the proceedings in connection with a recent Order, where the petitioners had had ample opportunities of raising their objections at the inquiry before the Board of Trade, but had failed to take any action until the Order came before Parliament for confirmation. The Order was subsequently referred by Parliament to a Select Committee, to be conducted on similar lines to a Provisional Order. The members of the Board expressed their serious dissatisfaction at the frustration of the intention of the Legislature in connection with this matter; and it was decided that a strong protest should be made to the President of the Board of Trade.

(*b*) *Special Order under Section* 10—*Protective Clauses in favour of the Railway Company and the County Council.*—A case was brought to the attention of the Board where a Non-Statutory Gas Company were applying for statutory powers by a Special Order under section 10 of the Gas Regulation Act. The Order was being opposed by the County Council and also by the Great Western Railway Company; both objectors asking for very onerous clauses for their protection. With regard to the Railway Company's opposition, the Gas Company were quite prepared to give a reasonable protection similar to that granted in recent Orders. The clause which is being urged by the Railway Company, however, would have the effect of compelling the Gas Company to bear the cost of any additional expense incurred by reason of the existence of mains, &c., in connection with any future widening or alteration of the railway, even though the Railway Company have no such powers at the present time. The steps which the Council are taking to assist the Gas Company in the matter of the opposition both of the County Council and the Railway Company were reported and approved.

(*c*) *Insertion of the Northumberland or Winchester Clause in Electricity Special Orders of Local Authorities.*—The action which the Council are taking with regard to the continued insertion of these clauses in Electricity Special Orders of Local Authorities was considered and approved by the Board.

(*d*) *Railway Companies' Bill as affecting Gas Undertakings.*—It was reported that the Council had perused the Bills which are being promoted by railway companies during the coming session of Parliament, and that they had communicated with all the gas undertakings which appeared likely to be affected, in order to give them an opportunity of seeking adequate protection. Should any gas undertakings appear to be affected by such proposed measures, they should communicate with the Council without delay.

TAR.

A report was made by the Joint Committee of the British Road Tar Association with regard to certain matters which had been dealt with by them on the previous day. Among the questions discussed was an invitation from the British Engineering Standards Association that the Council should nominate a member to serve upon the Sub-Committee of the Association which had been appointed to revise the specification for tar for road purposes. It was decided to refer the appointment of this representative to the Tar Advisory Committee, which is composed of representatives of gas undertakings from all the districts, and which was meeting on the following day.

RAILWAY RATES STANDARD CHARGES.

It was reported that the Railway Rates Tribunal had indicated that they were determined to consider the fixing of proper standard charges for different classes of traffic, notwithstanding the fact that neither the traders nor the railway companies are yet in a position to deal with the matter. The subject was so complex that it was decided to appoint a small Committee of experts to watch the case for the gas industry.

ROYAL COMMISSION ON THE COAL INDUSTRY.

It was reported that the Council had lodged a strong protest against the statement made by a representative of the Miners' Federation of Great Britain before the Royal Commission on the Coal Industry, on Dec. 10, to the effect that "the profits made by gas and electricity supply companies showed that those industries which used coal on a large scale were in an exceptionally prosperous condition, benefiting by the low price of coal and the low wages of the miners, while at the same time fleecing the consumers of the heat, light, and power produced from the coal." The Council emphatically repudiated the statement made by this witness, which was in absolute contradiction to the evidence which the President of the Council gave before the Royal Commission on Nov. 4, 1925.

GAS LIGHTING ON RAILWAYS.

It was reported that the Council had been in communication with the general managers of the railway companies, suggesting that, when schemes were being considered for the lighting of railway stations, sidings, buildings, &c., preference should be given to the continued use of gas for such purposes. Satisfactory replies were read from the railway companies with regard to this matter.

SMOKE PREVENTION.

[A Lecture delivered by E. W. Smith, D.Sc., F.I.C., of London, in the Council Chamber, Town Hall, Halifax, on Thursday, Jan. 14. The meeting was attended by Medical Officers of Health of the surrounding districts, and the leading citizens of Halifax, by invitation of the Gas Committee.]

Fuel economy is nationally important; but fuel economy can only indirectly be of any assistance to the miners in their present difficulties. It is quite imaginable that, if methods could be adopted in the use of fuel which would assist in reducing the cost of production of our goods, then more coal would be used owing to the increased output of our manufactures, trade would be better, the individual would have more money to spend, and even domestic coal would go up in consumption.

The Coal Commission has a very difficult task. It is advised by Dr. Lander, of the Fuel Research Board, whose prime objective is, and will be, the development of methods in the utilization of fuel which are more efficient than heretofore. This will inevitably mean, in the first instance, a reduction in the demand for fuel. The Coal Commission desires to increase the demand for fuel, so that to some extent the functions of the two bodies—the Coal Commission and the Fuel Research Board—are in opposition.

The mine owners believe that the only way in which the mining industry can be saved is by reducing the cost of coal at the pitmouth, and by lowering railway rates, and that the primary way to reduce the cost of coal at the pitmouth is to ask the miners to work longer hours for lower wages. It does not appear to have occurred to anyone to put forward the suggestion that if the mining industry depends on increased output, and if increased output depends on the cost of coal to the consumer being reduced, then it is of primary importance that the customer should be shown how he may use less coal, or other form of fuel derivable from coal, than he has previously used. In other words, no serious combined national effort appears to have been made to show that by increased efficiencies the cost of fuel to the consumer may be reduced, and that after all the consumer is only interested in the over-all cost of fuel for any given operation. It is only a matter of academic interest to know how many tons, or pounds, or cubic feet he may be using. This means of relieving the situation is one which will take time; but the longer it is delayed, the harder it will be. There is therefore every reason why fuel economy should be encouraged; and as economy means, not the mere saving or doing without, but the correct use, it is extremely advisable that properly directed research should be undertaken or continued in every practical direction.

As an illustration of what I mean, I would indicate the use of gas for domestic purposes. There is no doubt, and no one has ever suggested otherwise, that a heat unit of gas costs more than a heat unit in the form of coal; but gas can be used with at least double the efficiency for domestic purposes that is obtainable from coal. This of itself does not always wipe out the discrepancy between the costs of these two fuels; but from my own experience, and from that of hundreds of others, it is incontrovertible that a house run largely on gas, as compared with a house run entirely on coal, costs a great deal less to run. The indirect savings due to the reduced amount of labour necessary in running a middle-class house include cut-

ting-out in some cases a second maid, and in other cases eliminating a maid altogether, consequently reducing the size of the house that is necessary to live in by at least one room, reducing the rates, income-tax, the expense of the maid, and many other indirect costs in connection with the maid, and doing away with much dirt to personal linen, curtains, wall-papers, ceilings, the cost of fire-lighting materials, chimney sweeping, together with other things too numerous to mention. All these matters must be taken into account before one can assess the relative values of two different methods of generating heat for domestic purposes; and, as stated before, there is no doubt whatever that in by far the majority of cases the gas form of heating is much cheaper for any normal household than coal.

The same thing applies to industry. The crude methods of direct coal firing, however highly developed, are often cheaper, fuel for fuel, than the use of gas, whether it be town gas or producer gas; but the precision that is possible when employing a controllable fuel like gas is of advantage in that the number of spoilt articles in the processes of production is reduced enormously. As one instance, the printing trade is in the habit of melting large quantities of metal in cast-iron pots. With coal, the cost of renewal of pots is in many cases equal to the cost of the coal. By the adoption of correct gas firing equipment, pots have an almost indefinite life—as many years as previously they had weeks; and on that one count alone the difference in the cost of fuel is completely wiped-out. Further, in this particular industry, the cost of gas, owing to high efficiencies and high outputs, is actually no greater than the cost of coal with old methods; and during the last three years there were more than 120 installations of a large type in this country, in printing offices, converted from coal to gas.

The contribution of the gas industry to the work of fuel economy and smoke prevention is a very high percentage of the total contributions that have been made in this direction, and is infinitely greater than any other single contribution. And a beginning has only been made. When one considers that in many of our large cities the demand for gas, at a time when the cost is not so low as it has been, is increasing more rapidly than ever before—except in exceptional times of war—and that this has been regarded as a fully developed industry, it will be realized that the general public are taking this industry to their hearts, and taking full advantage of the facilities that are offered.

The prevention of smoke is a subject which has only created an academic interest in the minds of the general public in the past. There does not seem to be enough conviction that there is money in it for the individual. It has been considered too much a luxury. Those who have gone most carefully into the whole matter—business men and idealists, and particularly the former—are now thoroughly convinced that the pall of smoke which normally obscures our cities does direct and indirect harm which, financially, is of enormous importance. It is difficult to assess the value of health in connection with national wealth; but a very short examination of the question must bring conviction that a healthy community should be from 20 to 50 p.ct. more capable of creating wealth than a community suffering from incessant colds, pneumonia, lack of tone, and the like. Sunlight is of vital interest to industry, and it is agreed by all who have studied the matter that smoke from both domestic and industrial sources screens-out a large proportion of the health-giving, vitalizing rays so very necessary for the maintenance of a strong and vigorous race; and everything that can be done to reduce the smoke nuisance should be done, not only on æsthetic grounds, but primarily on the grounds that it will pay to do so.

There has been a great deal of activity during the last few years in an attempt to produce a solid smokeless fuel. Special methods have been devised and developed, much capital has been raised—and lost—but so far all such methods have been uneconomic, and many of them have been technically unsound. The gas industry has it in its power to produce a solid smokeless fuel which for most purposes can supply the need for such material. Coke, screened to the size for which it is required, and dry, can be obtained from many gas-works. This is not a mere ideal. It is normal practice in many towns, where the whole of the coke is being readily sold for domestic purposes. Much more, however, still requires to be done, and the gas industry in filling the demand is endeavouring to cater for it. This should have the effect of reducing the price of gas, which will, again, encourage the poorer part of the community to use gas more extensively, where now they feel it is too dear.

I look forward to the time when the gas industry will be the sole purveyor of fuel to the community; when a gas company will sell coal and coke, and oil and gas; when the middleman will have been largely eliminated; when duplication of storage and sidings will have been rendered unnecessary; when it will be the gas company's prime incentive, with all sources of fuel at its disposal, to produce that which will be of greatest national advantage, and of the highest economic value.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Visit to the "Veritas" Incandescent Mantle Works, Wandsworth.

On Thursday, Jan. 14, the Association visited the "Veritas" Works, in Garratt Lane, Wandsworth, of Messrs. Falk, Stadelmann & Co., Ltd. The gathering was a large one, about a hundred members taking part—and this in the face of weather conditions which would have discouraged any but the most stoical.

On arrival at the works, the visitors were met by the Joint Managers, Mr. H. G. Morgan and Mr. H. C. Wild, and were then divided into sections.

Description of Works.

The factory stands on the site of the old McMurray paper mills in Garratt Lane, occupying an area of 6¾ acres. The derelict buildings were taken over by Messrs. Falk, Stadelmann, & Co., Ltd., in 1919. It was necessary to double the size of the existing buildings; but, as a result of their energy, and in spite of the difficult times prevailing, they were able to commence manufacture in the same year. The factory, which occupies a floor space of 90,000 sq. ft., is perhaps the largest of its kind in the country, and possesses the most up-to-date plant for the manufacture of gas mantles that it is possible to obtain. It is designed for an annual output of 20 millions, and employs about 500 workpeople.

Processes of Manufacture.

The raw materials are monazite sand, the Tschuma plant, and artificial silk. The first is found mainly in Brazil and Travancore, and from it thoria is extracted, and converted into thorium nitrate. From the second, which is a native of the plains of Yang Tse Kiang, is spun ramie thread, which forms the carrier of the thorium nitrate and the other chemicals used during the course of manufacture. Artificial silk is employed to a large extent as a carrier, instead of ramie.

The thorium nitrate, together with 1 p.ct. of cerium nitrate and about ½ p.ct. of hardening chemicals, is dissolved in distilled water. The ramie yarn or artificial silk is knitted in long cylindrical stockings on specially designed machines in many widths and textures.

The ramie contains mineral matter and grease, which are next removed. If this were not done, there would be a tendency for holes to appear in the finished mantle. The washing is in reality a chemical process, and consists of dissolving-out the foreign bodies by prolonged soaking in dilute acid, and then subjecting the hose to alternate rinsing with distilled water, and centrifuging. From this stage, the manufacture of upright and inverted mantles must be considered separately.

Upright Mantles.

The washed ramie is cut into strips a good deal longer than the finished mantle is to be; and one end is strengthened mechanically by doubling a piece of gauze round this portion, and sewing it in position. The stockings are now soaked in a bath containing the impregnating fluid, and are passed through rubber rollers at a definite tension, varying with the quality and size of mantles being made. This ensures that a constant weight of fluid is left in the mantles, which are then drawn on to papier mâché forms, and dried. At this stage the head of the mantle is strengthened once more by impregnating it with a solution of hardening chemicals. It is pleated, and an asbestos thread is drawn through and tied into a loop. Branding of the mantles follows. Then comes the burning operation. The mantles are drawn sharply over wooden frames, to open-out the base, are suspended from iron hooks, and ignited at the head. Amid considerable shrinkage, an ash consisting of the oxides of thorium and cerium is formed, which is first shaped by hand, and then hardened on a machine fed by a gas-air mixture under considerable pressure.

Inverted Mantles.

Impregnation of inverted mantles takes place directly after washing. As in the case of upright mantles, the hose is impregnated in long strips, is dried, and then cut to size. The sewing is done either by machine or by hand.

Machine Sewing.—One end of the mantle is pleated, and impregnated ramie thread is drawn through. The other end is tied on the ring, and the mantle is branded. It is then turned inside out, the ends are tied together, excess of impregnated thread is cut off, and, after being turned back, the pleats are smoothed-out, and the mantle is folded and boxed. This method gives rise to what is known as a "spider"—*i.e.*, a small bunch in the bottom of the mantle—the weight of which might be a

cause of weakness in a small mantle, which is therefore sewn by hand.

Hand Sewing.—The mantle is tied on the ring, and branded. The top is then unravelled slightly, drawn together, and sewn-up with impregnated thread. This gives a spiderless base.

DIPPING AND PACKING.

Both upright and inverted mantles are dipped in a solution of collodion, and are then dried. This covers them with a glossy protective film, and renders them transportable. They are then sorted and packed. In the case of upright mantles, they are first gauged and trimmed to size. They are put up in "outers," each containing a dozen. These then pass to the dispatch department, where they are packed in 10 or 15 gross cases, which find their way all over the world.

To ensure that the high standard of quality found in "Veritas" mantles is always maintained, samples of the work passing through the factory are taken at regular intervals, and submitted to drastic tests as regards their behaviour both under vibration and on the burner. Should any samples prove to be defective, search is at once made for the trouble, so that it can immediately be rectified. If any such samples should show a bad result on testing, the batch from which they are taken is not sent out.

The factory is well equipped with a large and up-to-date plant for printing and box making, which is more than sufficient to supply all needs in this direction.

Following the tour of inspection, the visitors were entertained at tea by the firm—Mr. MAX FALK, Chairman of the Company, presiding.

Mr. W. L. WESTBROOK, President of the Association, remarked that they had enjoyed an inspection of what was probably the most up-to-date gas mantle factory in the kingdom. He had most pleasant recollections of a visit to the Company's factory—which at that time was at Earlsfield—about ten years ago; and what he had seen during the present visit demonstrated the remarkable advances which had taken place since 1915. The site of the factory in Garratt Lane, which was originally occupied by paper mills, was acquired by Messrs. Falk, Stadelmann in 1919; and Mr. Max Falk had told him that the design of the present works was due to Mr. Morgan, who had so well looked after their interests that afternoon. It was Mr. Morgan, too, who was responsible for the design of many of the interesting machines they had seen in their tour of inspection, during which they had traced all the operations of mantle manufacture, from the raw fibre to the finished product, including box making. All had been greatly impressed by the excellent work of the employees, which really provided testimony to the wise policy adopted by the firm.

Mr. A. D. BILLINGHAM (Gas Light and Coke Company) proposed a vote of thanks to Mr. Max Falk, Messrs. Morgan and Wild, and to Messrs. C. Falk, Godfrey, Manson, Mercer, Clark, Hooson, and Hookway, who had acted so admirably as guides. There was no question, said Mr. Billingham, about the excellent organization of the works, and the lay-out spoke well for the designer.

Mr. A. S. STAINER (Gas Light and Coke Company), who seconded, said it was remarkable, after seeing the many processes in the manufacture of the gas mantle, to realize that the cost of the finished product was so low.

Mr. S. B. CHANDLER, Distribution Engineer of the Tottenham District Light, Heat, and Power Company, supported the vote. What they had seen that afternoon, he remarked, must have been a revelation to many of the care and accuracy and technical skill which were necessary for the making of a good incandescent mantle. Messrs. Falk, Stadelmann were to be congratulated on having a factory with so much air space. Certainly the Factory Inspector could find no complaint. The conditions under which the workers operated were admirable, and this perhaps accounted for their remarkable speed.

Mr. W. J. LIBERTY mentioned that he was among those who visited the Earlsfield works of the firm ten years ago, and in common with other speakers had noted with satisfaction the great progress which had been made since then. It was in 1895 that London streets were first lighted by the incandescent mantle. In the years which had followed, the upright mantle had given way to the inverted, and high pressure and superheating had been introduced; and after seeing the speed of work, and realizing the business acumen, of the firm whose works they had visited that day, they had every reason to be optimistic of the future.

Mr. MAX FALK, speaking on behalf of the firm, said they were highly honoured by a visit from the Association, and were particularly gratified to see such a large gathering. The attendance certainly showed a disregard of weather conditions. Mr. Westbrook had referred to a former visit. Much had happened since then, and considerable expansion had taken place in the gas industry, which was a national institution the importance of which could not be exaggerated. Some people fondly imagined that the gas industry was a dying business. Well, such people would have excellent refutation of their ideas if they visited the "Veritas" factory. The problem of gas lighting had engaged the attention of experts for many years. The flat flame had given place to the Argand burner, which in turn had been superseded by the incandescent mantle, which had revolutionized gas lighting, and before which, he would say, there was a vast, almost unlimited, future. There was no doubt that the London and Southern District Junior Gas Association could do a great deal of good work in furthering the interests of the industry by educating the public, for it was only too true that a large section of the community had no real knowledge of the functioning of an incandescent burner. An ordinary incandescent mantle went through no less than twenty-six different processes during the course of its manufacture; and it was the aim of the firm to produce a thoroughly reliable and lasting product. Tremendous strides had been made during recent years, and to-day they were able to produce a stronger and better article. Regarding street lighting—and to his mind this constituted an important field for the use of gas—there were at present about 700,000 gas lighted street lanterns; and during the last five years, in spite of intensive electrical competition, there had been an increase of 22,000 gas lamps. Moreover, in the principal foreign cities, gas was still very largely employed as the street lighting agent. Concluding his remarks, Mr. Falk expressed his appreciation of the valuable work done by the London and Southern Juniors.

Mr. MORGAN also said how delighted he was to see the members of the Association. On behalf of his colleagues he thanked them for the kind remarks which had been made.

WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION.

[In a paper dealing with condensation, Mr. T. V. Blake, of Cardiff, details the various phases of the condensation and purification process on the gas produced by a Glover-West installation of continuous verticals.]

In the absence, through indisposition, of the President, Mr. B. J. BELL presided at the meeting of the Association held at Cardiff on Saturday, Jan. 9.

On the motion of the CHAIRMAN, a vote of condolence was extended to Mr. C. F. Botley, M.Inst.C.E., President of the Institution of Gas Engineers, upon the great bereavement he had sustained by the death of his wife.

The CHAIRMAN expressed the pleasure of the members of the Association in again being favoured with Mr. J. E. Mogford's presence at their meeting.

Mr. MOGFORD formally presented to the Association five volumes comprising the essays of Dr. Watson, Bishop of Llandaff, on "Pit Coal." Mr. Mogford remarked that the volumes, which were some 150 years old, would prove interesting. Dr. Watson's essays dealt with such problems as coal conservation, the production of coke, and smoke pollution.

The SECRETARY, in accepting the volumes on behalf of the Association, tendered the warm thanks of the Association to Messrs. J. E. Mogford, W. Cranfield, J. H. Canning, and T. A. Canning, who had presented valuable books to their library.

The CHAIRMAN, in calling upon Mr. T. V. Blake, of Cardiff, to read his paper, referred to the fact that a wish had been expressed by the Institution of Gas Engineers that those gentlemen who had been successful in gaining Diploma Awards should present their theses to various Associations. They were fortunate in having two members who had gained Diplomas, and they had both undertaken to read papers to the Association. Mr. Blake, one of these gentlemen, had taken his Diploma thesis as the basis of his paper.

CONDENSATION AND WET PURIFICATION.

By T. V. BLAKE, F.C.S., of Cardiff.

[Extracted.]

It is proposed in this paper to detail the various phases of the condensation and purification processes on the gas produced by the Glover-West continuous vertical retort installation at the Grangetown Gas-Works, the capacity of which is 5 million c.ft. per day. Continuous steaming of the charge at 15 lbs. per sq.in., through $\frac{3}{8}$-in. nozzles, is the existing practice. The coals in use consist of the screened and through gas-making varieties, from the Yorkshire, Midland, and South Wales coalfields. During the time the tests were being carried out, the mixture consisted approximately of equal proportions of English and Welsh coals. The temperature in the combustion chamber was 1180° C., and throughout per retort $2\frac{1}{2}$ tons per day. The quality of the coals used is shown in Table 1.

Of the total tar produced, only about 40 p.ct. enters the condensers; the remaining 60 p.ct., being of a heavy nature, is deposited in the hydraulic and foul mains.

In the light of modern experience, the ideal process of condensation is carried out by gradual cooling, whereby the hydrocarbons and aqueous vapours are thrown down in sequence, by reason of the reduction in the saturation point of the gas, consequent upon the decreasing temperature. It may here be mentioned that it is the aqueous vapour which accounts for the greater portion of the work entailed in cooling the gas. The hydrocarbon condensates may be divided as follows:

(1) Heavy tars.
(2) Medium tars.
(3) Tar fog.

TABLE 1.

Carbonization Tests.							Analyses of Coal.				
Yield of Gas per Ton, C.Ft.	C.V. of Gas, B.Th.U. per C.Ft.	Therms per Ton.	Coke per Ton, Cwt.	Breeze per Ton, Lbs.	Tar per Ton, Galls.	Liquor per Ton, Galls.	Moisture P.Ct.	Volatiles P.Ct.	Ash P.Ct.	Sulphur P.Ct.	Nitrogen P.Ct.
10,629	621	68	12·4	123	10·1	18	2·41	32·48	7·39	1·54	1·25

REMARKS:

(1) The above data refer to carbonization tests and analyses of an average mixture of approximately equal proportions of screened and "through" gas-making varieties from the Yorkshire, Midland, and South Wales coalfields.
(2) The carbonization tests were carried out on 2 cwt. charges in a small horizontal experimental plant, working in parallel with the larger installation.
(3) The analyses of the coals are the results obtained by the methods usually adopted in the laboratory.

TABLE 2.—*Estimation of Gases.*

—		Extractor.			Condensers.			Livesey Washer.			Rotary Washer.		
		Inlet.	Outlet.	Absorbed.	Inlet.	Outlet.	Absorbed.	Inlet.	Outlet.	Absorbed.	Inlet.	Outlet.	Absorbed.
NH_3	Grains per 100 c.ft.	271	261	10	261	60	201	60	38	22	58	0·5	37·5
	P.ct. by weight of total	..	..	3·7	..	..	74·1	..	..	8·1	..	..	13·9
	P.ct. by volume	0·855	0·724	0·131	0·724	0·189	0·535	0·189	0·120	0·069	0·120	..	0·119
H_2S	Grains per 100 c.ft.	541	457	84	457	388	69	388	348	40	348	318	30
	P.ct. by weight of total	..	..	19·5	..	..	12·8	..	..	7·4	..	..	5·5
	P.ct. by volume	0·287	0·243	0·044	0·243	0·206	0·037	0·206	0·184	0·022	0·184	0·169	0·015
CO_2	Grains per 100 c.ft.	4985	4969	16	4969	4903	66	4903	4740	163	4740	4406	234
	P.ct. by weight of total	..	..	0·3	..	..	1·3	..	..	3·3	..	..	4·7
	P.ct. by volume	6·1	6·08	0·02	6·08	6·00	0·08	6·0	5·8	0·2	5·8	5·4	0·4
CN	Grains per 100 c.ft.	168	158	10	158	145	13	145	98	47	98	74	34
	P.ct. by weight of total	78·5	71·8	6·7	71·8	67·5	4·3	67·5	45·6	21·9	45·6	34·4	11·2
$C_{10}H_8$	Grains per 100 c.ft.	5·13	2·14	2·99	2·14	1·43	0·71	1·43	1·02	0·41	1·02	0·11	0·91
Tar Fog	Grains per 100 c.ft.	1450	1315	135	1315	1050	265	1050	290	760	290	45	245
	P.ct. by weight of total	..	..	9·3	..	..	18·3	..	..	52·4	..	..	16·9
	Temperature of gas, ° Fahr.	142°	141°	..	141°	60°	..	60°	62°	..	62°	59°	..

TABLE 3.—*Liquor Tests.*

—	Tar Extractor.	Outlet Condensers.	Outlet Livesey.	First Bay Rotary Washer Outlet.	Last Bay Rotary Washer Inlet.
Specific gravity	1·0056	1·0135	1·0225	1·0213	1·0070
Ounce strength	2·05	5·53	7·95	7·18	2·04
	Parts per 100.	Parts per 100.	Parts per 100.	Parts per 100.	Parts per 100.
Free ammonia	0·432	1·129	1·486	1·377	0·279
Fixed ammonia	0·013	0·071	0·195	0·180	0·164
Total ammonia	0·445	1·200	1·680	1·557	0·443
H_2S	0·279	0·103	0·300	0·287	0·056
CO_2	0·396	1·399	1·452	1·487	0·572
CNS	0·011	0·032	0·106	0·103	0·094
Temperature, ° Fahr.	122°	78°	64°	63°	58°

A glance at Table 2 (tar fog) and Table 4 (tar samples taken at the seal pots of the different apparatus in the series) will show that these tars are deposited in the above order.

It will be noticed that, while the specific gravity of the anthracene fraction and the percentages of pitch and free carbon decrease, naphthas and heavy oil fractions show an increase, as we pass through the series.

The elimination of tar fog presents the greatest difficulty, since it is noticed (in Table 2) that, in spite of normal temperatures existing, and the nature of the methods used—centrifugal force, wire drawing, friction, &c.—for eradicating it, the export spent oxide from the purifiers seldom contains less than 2 p.ct. of tar. A layer of suitable oil on the surface of the liquid in the washing plant, or spraying the gas with light tar or tar oils, has been found to be efficient in the removal of tar fog, by solvent action rather than by causing the vesicles to coalesce.

TABLE 4.—*Dehydrated Tar.*

Water in Original Sample.	Density at 60° Fahr.	Free Carbon.	Light Oils up to 170° C.		Middle Oils, 170° to 230° C.		170° to 230° C.		Creosote Oils, 230° to 280° C.		Anthracene Oils, 280° to 310° C.		Pitch by Diff. (Wt.).
			By Wt.	By Vol.	By Wt.	By Vol.	Naphthalene (wt.) of Tar.	Phenols (Vol.) of Tar.	By Wt.	By Vol.	By Wt.	By Vol.	
		P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.
Cyclone. 19·3 p.ct. NH_4Cl deposited	1·098	4·6	1·70	3·7	13·98	15·7	1·53	3·7	13·90	15·7 solid deposit	19·18	20·3 solid deposit	Medium hard 55·24
Outlet Condensers. 53·7 p.ct. Large amount of NH_4Cl	1·070	4·5	7·72	9·0	18·48	20·5	0·81	5·48	13·61	9·6 solid deposit	9·20	9·0 solid deposit	Very glossy and brittle 54·99
Outlet Washers. 14·6 p.ct. NH_4Cl absent	1·060	2·0	7·33	8·9	22·79	24·9	0·70	3·1	13·41	13·9 solid	5·67	5·7 No solid deposit	Very glossy, hard, and brittle 50·80
Outlet Rotary Washer. 7·9 p.ct. NH_4Cl absent	1·059	1·0	7·28	8·9	25·11	28·7	1·05	4·6	12·89	13·7	5·57	5·6 No solid deposit	Very hard 49·15

AMMONIA RECOVERY.

By reference to Table 2, it will be noted that 74 p.ct. by weight of the total ammonia in the gas is contained in the liquor from the condensers, leaving the small remaining portion to be removed in a plant specially designed for this purpose. It is well known that ammonia has a great affinity for the acidic constituents CO_2 and H_2S of the gas, forming ammonium carbonate and hydrosulphide respectively. Hence the usual practice is to use as a primary washing medium the strong liquor formed at the condensers, followed by clean water for the extraction of all but the last traces of ammonia. These are allowed to pass forward to the oxide purifiers, thereby increasing the efficiency of the oxide for the removal of H_2S.

The character of the liquor obtained from vertical retorts may be of interest, especially as the effluent liquors from sulphate of ammonia plants operating on gas liquor from vertical installations have been, and still are, engaging the attention of the Alkali Works Inspectors, owing to the deleterious effects on fish life, and also bacteria beds of sewage farms, consequent upon these liquors passing into the town sewers.

Attention was naturally directed to the conditions obtaining in the condensation and wet purification plants with gas from vertical retorts, as compared with similar plants receiving gas from horizontal retorts. Samples of the different gas liquors from the Livesey water seal pots were analyzed and compared. It was found that the liquors formed from vertical retorts contained a larger proportion of phenols, thiocyanates, thiosulphates, &c., which are capable of absorbing oxygen. It is well known that phenols are constituents of tar, and must get into the liquor by the latter coming into contact with the former during condensation, or in the collecting tanks for condensates on gas-works.

It has been suggested that the heavy tars should be thrown down at temperatures above the dewpoint of crude gas, and so prevent the existing scrubbing effects by liquor strong in free ammonia (in which phenols are soluble) experienced in the condensers; or be brought down by spraying with liquor rich in fixed ammonium salts (in which phenols are less soluble), and stored separate from the bulk liquor formed by cooling and washing. It has also been found that agitation or long contact with tar produces increased quantities of phenols in the liquor. It is therefore necessary to separate liquor from tar as soon as possible.

Thiocyanates and thiosulphates are secondary products formed in liquor by oxidizing agencies brought about by the oxygen from the coal itself, by intentional admission of air at the condensers, or by air drawn in at defective retort lids. The obvious way of reducing those objectionable constituents suggests itself without further comment.

The genesis of this nuisance is being investigated, but finality on the subject has by no means been reached in producing a sulphate of ammonia plant effluent satisfactory to the sewage authorities. All will agree that by increased demand for vertical installations for carbonization of coal, the responsibilities of the gas engineer will be by no means lessened Of course, the type and quality of the coals in use, temperatures of carbonization, and atmospheric temperatures, &c., all have their influences.

It is the writer's opinion that a reward greater than that resulting from the endeavour to control the plant efficiently for the production of one constituent only would be forthcoming if frequent and systematic tests were made on the composition of gas, tar, and liquor found in the different apparatus. It may be stated that the most profitable thermal balance of all constituents can only be obtained through the medium of constant chemical control.

The writer wishes to express his thanks to his Chief, Mr. H. D. Madden, for the kindly interest shown and the facilities so generously placed at his disposal. He is also indebted to his colleagues, Messrs. T. Huntley, L. Kleist, and C. Munroe, for their assistance.

Discussion.

Mr. T. ANTHONY CANNING (Newport) remarked that the possibilities of concentrated ammonia combining the recovery of free sulphur and/or the manufacture of H_2SO_4 should not be neglected, while the semi-direct and direct methods of sulphate manufacture were undoubtedly developments on the right lines. In the author's description of the plant employed, it was to be remarked that the gas stream was split on arrival at the condensation and wet purification plant. One stream passed through a Graham condenser, thence to the exhauster and Livesey wasners, while the other stream was diverted through a Colman cyclone tar extractor and annular condensing plant, before combining with the first stream on the inlet of the exhausters. It was to be observed, on reference to Table 2 (estimation of gases), that the grains of tar fog per 100 c.ft. on the outlet of the rotary washer amounted to 45. At this point, of course, wet purification ceased. It had occurred to the speaker that the introduction of a cyclone tar extractor on the inlet to the Graham condensers might have the effect of reducing this figure. Did the author consider that a tar extractor of this nature worked better under pressure? Mr. Canning contended that a reduction in the calorific value of gas of 5 p.ct., due to the elimination of the light-producing constituents, might be true of South Wales coals. The percentage reduction depended to a great extent upon the nature and composition of the gas being treated. Gas produced from certain English coals suffered more in this respect. Much useful work with regard to the eradication of naphthalene could be carried out in the condensing and washing plant. In the first place, control of heats was essential, though subsequent processes such as thorough cooling of the gas, washing, carburation, and the use of carburetted water gas should not be neglected. With regard to the removal of tar fog by the use of a layer of oil on the surface of the liquid in the washing plant, or spraying the gas with light tar or tar oils, had the author experienced that these methods could be utilized to serve a double purpose—*i.e.*, the elimination of tar fog and naphthalene? In view of electrical competition, high labour and other charges, and heavy cost of production, it would certainly be found that chemical control was the future salvation of the gas industry. Without it, processes were reduced to "rule-of-thumb," which could only result in inefficiency and extravagance culminating in high cost of gas. The Cardiff Company were doing pioneer work in this respect.

Mr. C. R. MONROE (Cardiff) expressed appreciation of the paper, and asked for some further information as to "wire drawing," referred to by Mr. Blake, for the eradication of tar fog, and also on eliminating in the retort house the formation of naphthalene.

Mr. C. B. FELTON (Newport) asked for further particulars of the temperatures of the gas.

Mr. G. H. HEARSON (Pontardawe) asked if the employment of wet or dry steam would affect temperatures.

Mr. BLAKE, replying to the points raised, said that, with regard to ammonia, it should not be forgotten that the primary object of a gas undertaking was the manufacture of gas. Ammonia was decomposed at a temperature of about 600° C., whereas the temperature of the retort was twice that figure. As to vertical retorts, it might be observed that it was not that more ammonia was obtained from the coal, but that more ammonia was preserved, after being formed, in that type of retort. He thought the manufacture of sulphuric acid on a gas-works quite feasible, and considered the day was not far distant when gas-works generally would be producing that commodity from their spent oxide. With regard to the additional tar extractor, this would be a great advantage, but here again they were dealing with vertical tars, which were very different from the horizontal retort tars. It would be observed that the specific gravity at the tar extractor and at the outlet of the rotary washer was little greater than the specific gravity of water. At Cardiff they had to contend with a light tar which comprised a great proportion of tar fog. They employed the cyclone under pressure when treating gas from the water gas plant, but it was hardly fair to state that as a particular case. With regard to the 5 p.ct. reduction in calorific value, on straight coal gas from horizontal retorts, he considered the figure mentioned a fair one. The tables would show that the naphthalene produced in a vertical retort was very much lower than in horizontals. In his opinion, naphthalene should not be formed at all—it was really due to inefficient carbonization, and chiefly to overheating the gas after it was formed in the retort, and before it left the retort. Modern practice favoured shock condensation very near to the retorts, to bring down the heavy tars, and with them the greater proportion of the naphthalene present, followed by gradual condensation, with beneficial effects on the lighter tars carried forward. Mr. Monroe had referred to "wire drawing." This indicated the passing of the gas through the perforated troughs of a Livesey washer. In regard to Mr. Felton's queries as to temperatures, he would say that the tests were carried out in the spring, when atmospheric conditions were favourable. In regard to Mr. Hearson's question, what was wanted was a dry superheated steam at not too great a pressure. Wet steam would cause naphthalene troubles, if naphthalene was present in any great quantity.

A vote of thanks to the author, proposed by Mr. MOGFORD, and seconded by Mr. A. E. MARTIN, of Merthyr, was carried with acclamation.

Hearty thanks were accorded to the Chairman and Directors of the Cardiff Gas Light and Coke Company, and to Mr. H. D. Madden, for the facilities provided for the meeting.

Gas for Making Flaked Glass.

The manufacture of flaked glass for use in office partitions and windows, which has within the last few years become an important industry, is based, according to the "American Gas Journal," upon the use of automatically controlled gas heating. The process is similar to that employed by the American Indians in making flint arrow-heads. The flint was shaped by heating the stone and dropping cold water upon it, each drop causing a chip of stone to fly off, because of the sudden contraction caused by the water. The glass to be treated is first sand-blasted. This produces a milky, frosted surface. The glass is then coated with glue, and subjected to a gradual drying process in a gas-fired oven. Absolute control of the heat is essential, for which reason gas fuel is used. The drying, which takes about twelve hours, causes the glue to contract; and this, in turn, makes the glass shrink and shrivel-off in flakes. It is estimated that each square foot of flaked glass produced requires the consumption of 5 c.ft. of gas.

Mr. William Pike Gibbons, of Torquay, who died last August at the age of 69, late Chairman of Messrs. Gibbons (Dudley), Ltd., Messrs. Gibbons Bros., Ltd., and Messrs. John Hall & Co., Ltd., of Stourbridge, left estate of the gross value of £26,391, with net personalty £24,360.

COKE COMPETITION PAPERS

Which obtained the Ten-Pound Awards.

SECTION II. [See also last week's "JOURNAL," pp. 97-103.]

PLANT FOR COKE TREATMENT.

By "THISTLE."

[HERBERT B. HOLLIDAY, Gas and Water Department, County Borough of Wallasey.]

Experience has proved beyond all doubt that the coke produced for sale must now receive the greatest expert technical consideration. The old-fashioned habit of calling everything put into the retorts "coal," and everything discharged "coke," must be superseded.

Coke must be produced as near 95 p.ct. pure carbon as possible; and this, again, must be sized or graded to suit the different local demands. The first and all-important governing factor in the production of cokes of all grades is, of course, the coal. If the gas undertaking could be supplied with even 95 p.ct. pure coal by the colliery, then the first great step would have been taken Unfortunately, this requirement appears to be quite beyond the power of the present-day colliery engineer. Very few gas undertakings can rely upon receiving throughout the contract period supplies of coal containing—on the average—less than 8 or 10 p.ct. inerts (moisture and ash).

In passing, two points are worthy of consideration, as both represent absolute financial waste and loss which could be avoided:

(1) The weight of inert matter loaded, unloaded, and charged for in freight.

(2) The inert matter charged for as coal even before the gas-works process commences.

By eliminating the ash from the coal at the colliery, an immediate financial gain would be effected from these two conditions only, after which further gain would occur in the retort houses, and again on the coke plant.

The second, and most important, feature to be carefully considered is the moisture content of the coke as delivered from the retorts. The moisture content is, of course, dependent upon the system of quenching. For all screening and grading purposes, the ideal condition of the coke would be perfectly dry and still warm, but with all combustion completed. It is well understood that coke not properly quenched will burn in the air to form oxides and ash, and also incur loss of stock due to coke fires. Unfortunately these dangers tend to encourage over-quenching, and cases are to be found of coke containing as much as 20 p.ct. moisture. This state renders the coke quite unscreenable, and should never be allowed. Suppose a coke containing 20 p.ct. water and 12 p.ct. ash—equal to 32 p.ct. inerts—passed to the screens for treatment, the result would be screens blocked with wet dust, making separation and screening impossible.

For all purposes the water figure must be kept down to about 5 p.ct. after quenching. It is therefore assumed that the coke to be screened is discharged from the retort houses, well quenched, but with not more than 5 p.ct. water and about 12 to 15 p.ct. ash and shale. This coke is now ready to be conveyed to the screening and grading plant.

Before the actual sizes and grades of coke to be produced are definitely decided upon, the demands of the local market must be very carefully considered. In the first place, it is essential that all grades when produced should be quite free from dust and shale. The ash content under such conditions will, of course, be low; and the absence of shale will free the fuel from the dangerous explosions occurring during combustion, which send particles flying out into the room. An efficient grade for household coke is clean cubes between $1\frac{1}{2}$ and $\frac{3}{4}$ in. square, or of such a size as will pass over a mesh $\frac{1}{2}$ in. square and fall through $1\frac{1}{2}$ in. square. This fuel would be free from all traces of dust; but careful crushing and cascade screening would be necessary to eliminate the shale and as much of the ash as possible.

This grade, however, would prove quite unsuitable for any other than household purposes; and local conditions and demands would determine other grades. Fuel for smiths' furnaces would be of a much smaller nature, between $\frac{5}{16}$ and $\frac{1}{4}$ in. square; while fuel for market gardeners would be large coke which had passed over a $1\frac{1}{8}$ in. square mesh. Again, an excellent boiler fuel may be produced by the provision of a $\frac{1}{4}$ in. square mesh; and the very fine dust passing through this enjoys good demand for use on chain-grate stokers, &c. However, all these grades depend absolutely on local conditions, and must be provided or not as found necessary.

One large undertaking has recently installed a screening and grading plant to produce as many as seven different grades of coke, the most important of which is called "apple size" coke for household purposes. This system will be described; but it must be understood that a plant of the size and complexity of this could only be installed under conditions of very large and varying demands. However, the possibilities and efficient arrangement of coke screening and grading plant are well illustrated in this system; and smaller units would simply mean less plant, the principle being the same.

COKE SCREENING, GRADING, AND WASHING PLANT.

Fig. 1 shows the general design of a modern plant for the production of screened, graded, and washed coke and coke breeze. The screening plant, in two sections, is arranged above large storage hoppers constructed of reinforced concrete, and divided internally into the required number of compartments. This scheme provides for filling of wagons, motors, and carts by gravity, thus increasing the output per day and saving labour. The coke from the retort houses is fed into an outside feed hopper, from which it passes through a regulated feed into a rotary filler, and on to a gravity bucket conveyor, by which it is elevated to the screening plant. It is then dis-

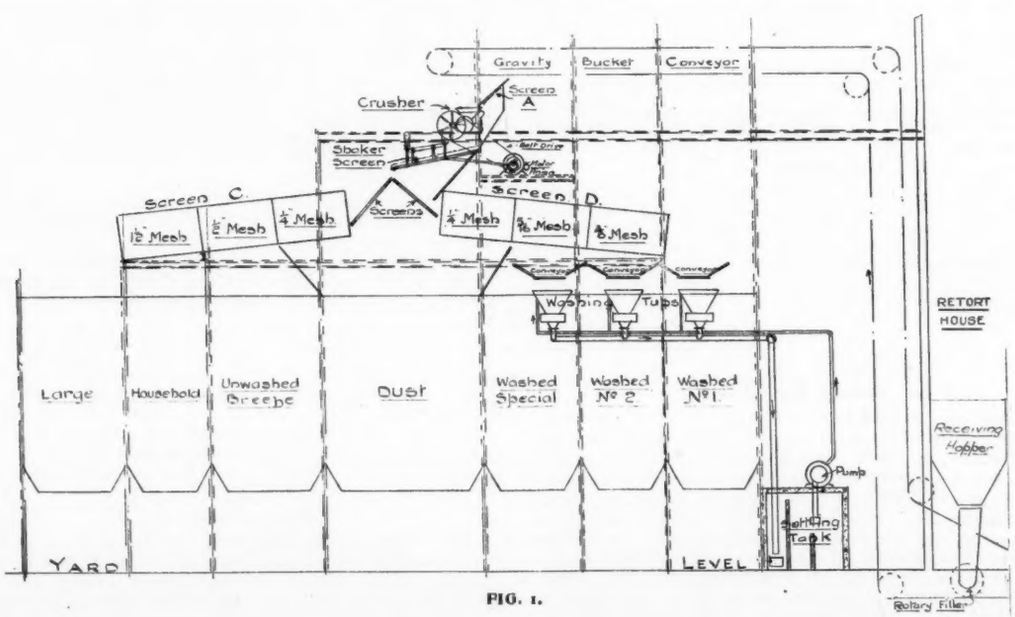

FIG. 1.

charged by a mechanical tipper on to the screen feed A to the crusher above the cascade screen and rotary screens.

It will be noticed that screen C is for the larger grades and screen D for the smaller grades. The shale and ash are separated from the coke by means of the one roll-plate regulation crusher, which is adjusted to break the coke to any required size. The shale and ash in the coke, being of foreign nature, separate when broken in the crusher, and are then passed on to the cascade screen, which has a "broncho-kick" motion. The shale, ash, and dust, together with coke breeze, pass through the cascade mesh, which is fitted with hanging knocker-plates to assist further the breaking-down action and separation of coke from the inert matter.

At this point it is advisable again to state that the coke must not contain more than 5 p.ct. of water when conveyed to the screening plant. It is absolutely impossible to treat a wet coke on cascade screens, as the whole screen becomes clogged with wet coke dust, thus failing to function as a screen at all, and acting as a chute to screen C for the coke, shale, ash, and dust. Experience has proved that this danger is very acute; and great care must be taken—especially in wet weather—to keep the cascade clear and at work.

The larger coke of the required size next passes into screen C for further grading; while the breeze, dust, shale, &c., go into screen D. The large amount of shale found in average coke is passed forward with these three grades; and experience has shown that some form of separator is absolutely necessary. In the present system, mechanical washeries have been installed, the principle of which is to float the light and clean coke over a weir into the storage hopper, while the heavy shale sinks to the bottom of the washing pan. This arrangement will be referred to later. It may be repeated here that the coke as sent to the screens should be dry and warm. Warm coke, being very light, floats over the weirs better than heavier coke, and also allows the finished product to be reasonably free from moisture.

The graded coke should be stored in overhead hoppers, so that wagons, carts, &c., may pull beneath the special section and fill by gravity, thus saving both labour and time of loading. The screening plant must be, of course, above these hoppers, somewhat in the style of the plant illustrated. The coke must be fed directly into the crusher; and a steady rate of feed is almost essential, both for the crusher and the screens. A little coke and regular feed is much better than a lot at intervals. The suggested installation of gravity bucket feed meets this case, and is also very economical from the upkeep point of view. The buckets can be filled to any capacity to suit the feed to the crusher or screens by regulation at the feed hopper.

The wear and tear on this type of handling plant is not heavy. The buckets wear out in time, as also do the chain pins. Lubrication is only necessary on the horizontal travel and tippers on top, and the filler at the bottom. The coke filler needs careful attention, and lining plates inside the chutes are advisable; while any shafts in the coke travel need protection. The chain of a gravity bucket conveyor must be of the safety link type, and bushed links are an advantage.

THE CRUSHER.

Opinions are divided upon the necessity or desirability of crushing the coke. The great objection is the large amount of coke breeze made by any type of crusher. The advantage lies simply in the fact that it is quite impossible to extract the shale and ash from large coke without crushing. For efficient screening and grading, the crusher is essential; and it should be very carefully selected. The one-roll crusher has many advantages, and produces a good uniform size coke, with a reasonable amount of small breeze. The adjustable back plate with springs makes this type much more adaptable than the two or three roll crusher. The drum is fitted with the necessary rings, and the back plate is adjusted towards or away from this drum to give the required size. The drive is fitted with safety pins of wood to shear at any undue pressure.

All types of crushers should have a removable mesh feed screen A, through which any small coke passes instead of going into the crusher to grind against the larger coke. This screen, which can be removed to by-pass the crusher if necessary, helps to reduce the amount of small breeze made. Of course, the crusher could be adjusted to make all breeze coke, if necessary. The upkeep of a one-roll crusher is much smaller than of any other type, as fewer rings are required, and no shafts. The safety device and belt drive also save any undue trouble. The wear and tear is slight, as the spring plate is adjustable, and the crushing action is against two external springs.

CASCADE SCREEN.

The cascade screen is arranged as indicated in fig. 2, at the outlet of the crusher, so that all the coke, both from the feed screen A and the crusher must pass over or through this mesh. This piece of plant may be looked upon as the dividing factor, or heart of the system. The large clean coke passes over, and the smaller breeze, dust, shale, and ash pass through. The correct form and size of mesh fixed can only be determined by careful experiment, as it is really dependent on the system of carbonization. Cokes from vertical retort installations require a long narrow mesh to allow the small segments of retort carbon to pass through, which condition is not present in horizontal coke.

Many types of cascade screens are now in use. The stationary steep-angled screen has met with some success; but very careful adjustment is necessary to keep the coke on the move and also cause the breeze, &c., to pass through. Experience has proved that the stationary screen very easily becomes blocked-up with shale, &c., passes breeze over with the coke, and under conditions of wet coke becomes useless. The wear and tear is practically small, as compared with the movable type, and the screen life is longer.

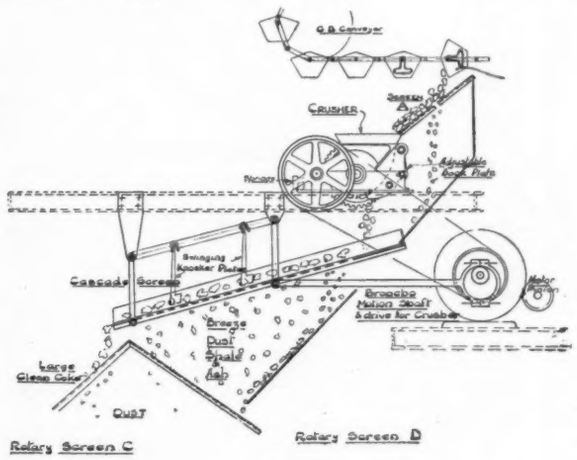

Fig. 2.

The most efficient cascade screen has proved to be the driven "broncho" type, which receives a kick-jerk forward motion from an eccentric, as shown in fig. 2. In this type excellent separation is possible, as the coke receives a second breaking action due to the "broncho" motion. Unfortunately, the wear and tear is heavy. Screen life is short, added to which there are moving-part renewals and power costs. However, with primary breaker and cascade motion, good graded coke may be obtained almost free from ash and quite free from shale. These conditions are absolutely necessary for the production of grades of coke which can be guaranteed to give entire satisfaction as fuel for household, factory, and works.

Some engineers claim that the cascade screen of the motion type will do the necessary dividing work without the use of a crusher. Unfortunately, such has not proved to be the case to any great extent. The cascade will not remove the retort carbon content of vertical retort coke at all, and can really only be relied upon to separate the loose and external breeze from the large coke. This part-separation is not sufficient; and the internal or "caked" shale must be got at, even though large percentages of breeze are made in the process. Household fuel must be free from shale; and to obtain this condition, a primary crusher is essential.

ROTARY SCREENS.

After leaving the cascade screen, the large coke passing over slides down the chute into the rotary screen C; the breeze, &c., passing through to the rotary screen D—all as indicated in figs. 1 and 2. Rotary screens are made in two distinct types:

(1) The circular screen.
(2) The eight-sided flat screen.

Type 1 is perhaps the better screen from the point of view of coke production only, as there is no corner-knock and less breaking of the graded coke. Experience has proved that the percentage of large grade coke made by this type is higher than in Type 2. The cost of upkeep and renewals, however, is much heavier, as the screen wires must be in segments curved around the circumference of the circle; while in the eight-sided screen the segments are flat, and also smaller in width. Type 2 has now been adopted in most cases, and the speed of revolution increased in an attempt to overcome the breaking of the coke.

As indicated, each screen is usually divided into three segments in length, thus producing three grades of coke in each. The screens revolve round a centre axis, and have runner wheels and rims at each end and between the meshes, both as drive and support, as shown in fig. 3. The first division in both screen C and screen D, as illustrated, is of small mesh, usually about ¼ in. square, for the extraction of the coke dust, which falls into the middle section of the storage hoppers. In the case of screen C, this is found necessary for two reasons—first, as a catch on the cascade for small quantities that have not passed through the division; and, secondly, to extract any dust formed by the new movement of rotation in the screen. In cases of very brittle coke, this rotary movement of the screen is apt to make more dust. The first portion of screen D is, of course, the dust screen proper; and care must be taken that this mesh is not large enough to pass the shale and ash content, which is more easily dealt with in the next three grades of coke breeze.

Now, as before, the sizes of the mesh for the middle and last

grades in each screen must be fixed by local conditions. In screen C the end partition would be the mesh through which the household coke would pass—about 1½ in. square—and all coke passing over this into the end hopper would be screened large coke for popular use in such places as stoves for market gardeners, central heating, furnaces, &c. The middle mesh is usually fixed at about ½ or ⅝ in. square, dependent on local demands, for sale as unwashed and ungraded breeze coke for

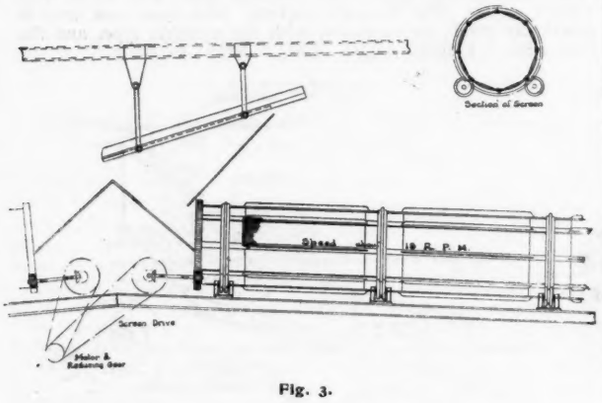

Fig. 3.

fuel in furnaces, natural draught boilers, &c. Under these conditions, the household fuel offered would be of such grade as to pass over a ½ in. square mesh and through a 1½ in. square mesh, to contain no shale, not more than 4 p.ct. water, and about 2 p.ct. ash. A regular supply of such coke at a reasonable price would be a very big step in the direction of popularizing a smokeless fuel for home use.

Returning to screen D, the last two meshes would be of such size as to deal with the breeze made, which would be sold as washed special breeze No. 1's, No. 2's, and No. 3's. The middle grade would produce an excellent coke breeze to pass through about $\frac{5}{16}$in. square mesh, which, after separation from the shale and ash, would be in great demand for use as a boiler fuel on mechanical stokers and boilers with forced draught. Again, local conditions would be the governing factor. The end grade on this screen would be about ⅜ in. square, and produce as required a fuel for use on blacksmiths' fires, &c.; while the coke passing over this mesh and into the end section of the hopper would be the same as the middle mesh of screen C in size, but would also be washed, as explained later, and guaranteed free from shale.

The three grades of coke breeze as made on screen D are, however, closely mixed with the shale and ash in particles of differing sizes as extracted from the coke in the crusher, and again to a similar extent on the cascade screen. The plant to deal with the extraction of this inert and dangerous content is explained in the next section. Many efforts have been made to carry this shale content into one grade only, so that one extraction would suffice; but, unfortunately, no means of keeping the size constant has been found, and large percentages of shale now occur in each grade after the dust mesh. As previously mentioned, special care must be taken to carry this over the dust mesh.

Coke Washing.

The special breeze coke, as produced in the last three grades or rotary screen D, is mixed with a very high percentage of shale and inert matter often called ash. This ash content comes to the gas undertaking from the collieries as coal, and passes right through all systems of carbonization, to appear again as a high percentage of inert impurity in the coke. The shale is found in many coals in the form of ironstone and roofing, but also certain amounts of retort carbon or scurf are mixed in the coke. Fortunately, these inerts differ very widely from coke, both chemically and physically; and when the mixture is passed through the crusher and efficiently screened, almost perfect division is obtained. Each screen mesh, however, passes a mixture of coke breeze and inerts, which must be efficiently separated.

This separation can very easily be obtained by throwing the mixture into a container of water—the coke floating, while the shale sinks. This separation, called washing, can be done by hand with sieves to remove the coke or by mechanical means as illustrated in fig. 4. Unfortunately, coke washing has one great drawback. The coke after washing is apt to retain a high percentage of moisture, thus greatly reducing the value from a calorific point of view. Experiments have been made to overcome this difficulty; and it has been found advantageous to feed the coke to the washers at as high a temperature as possible. It was on this account that the statement was made that the coke from the retort houses should be as dry and as hot as reasonable.

Separation by water is by far the most economical system from the gas engineer's point of view—especially as three distinct washing units may be required, as in the scheme illustrated. Magnetic means of separation are quite possible, by which all danger of excessive moisture would be avoided; but no engineer has yet put forward an economic process on these lines.

The washing plant shown in fig. 4 would be necessary for a coke screening plant arranged as in fig. 1. On this plant the mixtures passing through the middle and last meshes, and also over the last mesh and discharged at the screen end (three grades in all), require separate treatment. A short belt conveyor is arranged under the screen at each grade to carry the mixture directly into the washing tubs, as detailed in figs. 4 and 6.

These cast-iron washing tubs, as illustrated, have a valve box at the bottom—through which the pump delivers water to overflow with the coke at the weir—with bottom valves shut, or through which the heavier shale and ash, which have sunk to the bottom of the tub, pass away down the return pipe to the shale tank and elevator with this valve open. This process is very simple and efficient. The water valve is continually open, passing water over the weir, and carrying the lighter coke to the hopper; while the water passes through the screen back again to the pump tank. The bottom valves open to empty out the heavy shale, &c., as occasion demands, determined by the amount of material passing that particular screen. The emptying operation is completed very quickly, and does not interfere in any way with the washing of the coke. The valve box acts as a trap to enable the tubs to be cleaned out without emptying. The bottom valve is always shut when the top valve is opened, and *vice versâ*, while water is continually pumped into the side of the tub.

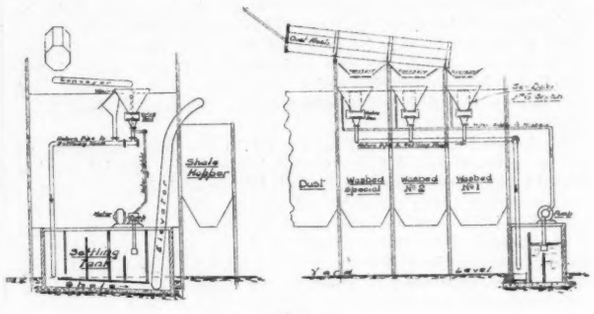

Fig. 4.

The heart of the whole system is, of course, the pump, together with an efficient method of dealing with the return water and shale. Some system of settling tanks is essential; and efficient treatment of the water must be arranged to allow continuous re-circulation to be carried on. Experience has proved that the pump supplied should have large reserve power, and be of anti-erosive metal. The circulation water contains small particles of coke dust and grit, which cannot be removed by ordinary settling tank methods, but have very great erosive action on the pump. The "Roturbo" type of pump has proved very successful for this work; but the vanes and pump body must be of specially hardened metal to withstand the erosion of coke dust, &c. It is also economically essential that the pump be duplicated, as any breakdown of the washing means untold trouble—either with working the washeries by hand, or through serious complaints of shale in the special coke.

The only trouble likely to be experienced with this system of coke washing is the disposal of the shale extracted. It is very essential that some use be made of it; but, unfortunately, the presence of the ash content of the coal intimately mixed makes this very difficult. Efforts to utilize the carbon fragments as fuel on mechanical forced draught stokers for tube boilers have proved futile, due to this ash content, which produces a sulphur acid action on the boiler tubes.

The washed special grades of coke produced by this arrangement are, however, almost perfect. The coke is clean, light, and comparatively dry and suitable for use as a fuel for all and any purpose. As beforementioned, the size of these grades of washed specials may be regulated by crusher setting, together with sizes of mesh on screen D, and must be fixed to suit local demands.

Storage of Coke.

The question of the necessity or otherwise of storing coke at the gas-works is one of importance from many points of view. It is, of course, essential in all cases that storage hoppers be provided of such capacity as to hold at least 48 hours' maximum make of screened and graded coke. Screening and grading must be carried out directly after carbonization; and any storage in heaps that becomes absolutely necessary should be of the different grades after screening, &c., has been completed, and under cover.

The question of the capacity required of sections of overhead storage hoppers can only be settled when the local requirements for different grades are known. Fortunately, the biggest demand for fuel of all kinds will be in the winter, during the periods when most coal is being carbonized, and therefore most coke produced. Careful experiment has proved that coke which

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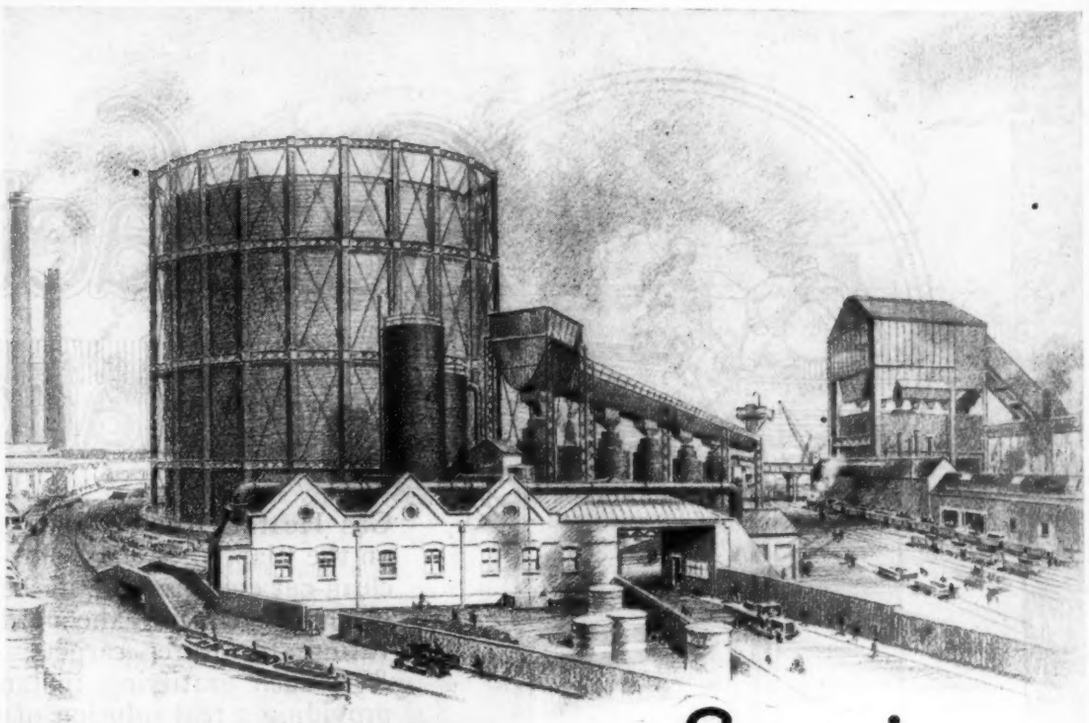

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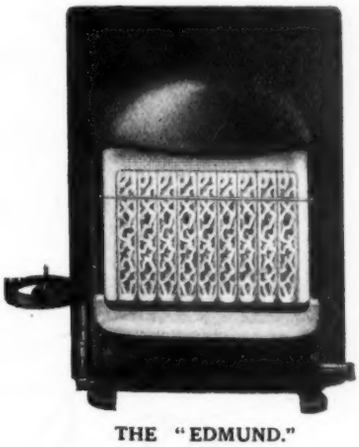

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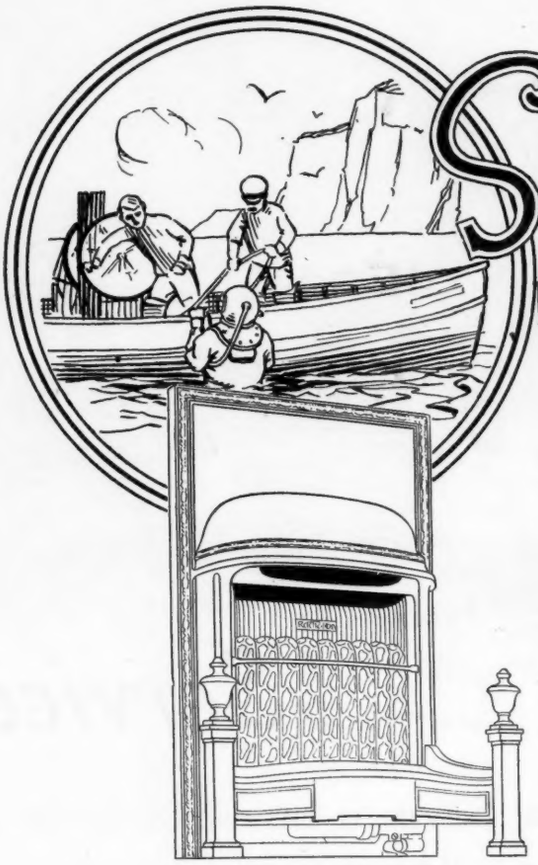

Satisfactory Ventilation

Gas Heating has so many arguments on the "labour-saving" side—so many clean-cut evidences of its being a sure means of reducing the need for renovating furniture, carpets, hangings, &c.—such gratifying instances of its providing a real solution of the much-discussed problem of domestic help—so sound a claim even on National grounds to the consideration of the Public—that the vital question of the ventilation afforded by gas fires is the only one on the lips of prospective purchasers.

The Radiation patent "Injector-ventilating" gas grates dispose of this question completely, and this is a highly important factor in their widespread use and general recommendation.

This feature is being consistently advertised, is highly popular and reassuring to the Public, and gives Radiation gas grates first place for hygienic excellence and efficiency.

RADIATION

GAS GRATES

features of the Radiation Gas Grates.

1 **Canopy correctly shaped** and proportioned. Renders the grate, when properly fixed, thoroughly hygienic. Embodies the patented "Injector-Ventilator," ventilating the whole apartment as efficiently as a coal fire.

2 **Patent adjustable flue nozzle,** which facilitates the fitting in front of an existing coal grate having a low canopy. Has a traverse of 90 degrees—i.e., from a vertical to a horizontal position, and can be set to any required angle between these extremes.

3 **The "Thermo-XX" fire front** on exhaustive tests is found to give the highest percentage of pure radiant heat. Upright radiants only are required; the separate horizontal top section being dispensed with.

4 **Burner is silent in action** and economical in gas consumption.

5 **Patent gas injector,** adjustable to obtain best results under all conditions of pressure and quality. Provision is made for the Gas connection on either side of the Grate, a reversible brass plug being supplied for closing the unused inlet. All the gas fittings are concealed within the Grate.

6 **The burner** is made in two types, **Simplex and Duplex.** In the latter case, the gas is controlled by a single three-position tap, which permits of the end jets on either side being extinguished, if desired, leaving the centre only burning.

Manufactured & Supplied by

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THE DAVIS GAS STOVE CO., Ltd., 60, Oxford Street, London, W. 1, and Luton.

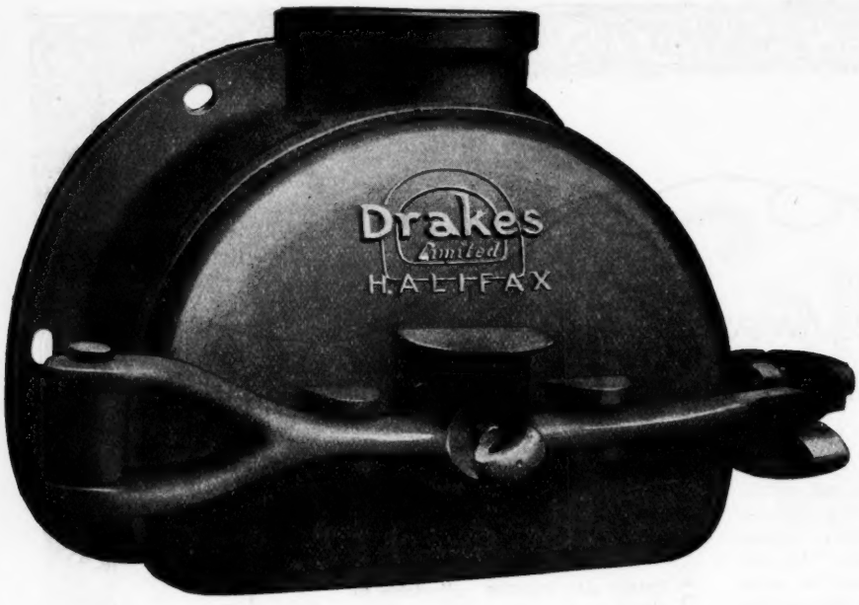
FLETCHER, RUSSELL & CO., Ltd., Palatine Works, Warrington, and London.

THE RICHMOND GAS STOVE & METER CO., Ltd., 164-172, Queen Victoria Street, London, E.C. 4, and Warrington.

WILSONS & MATHIESONS, Ltd., Carlton Works, Armley, Leeds, and London.

JOHN WRIGHT & CO., Essex Works, Aston, Birmingham, and London.

Radiation LIMITED Proprietors



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Service and Thoroughness

150-149

has been stored in the heap and then screened as required produces grades of fuel of much lower quality than the direct treatment process. Coke from the heap contains high water content and an excessive percentage of dust and small breeze in most cases; while the action of "weathering" affects it badly, to a degree varying with the time of exposure. This action of "weathering" of storage coke really depends to a large extent upon the way in which it is stored. If in the open, the rain has a two-fold action:

(1) It increases the moisture content.
(2) It washes the exterior dust and fine breeze into the coke.

Both tend to reduce the calorific value and also increase the difficulty of screening.

The worst feature of storage, however, is the crushing and intermixing of large coke, breeze, and dust due to the increasing pressure of a growing heap of coke. As coke is tipped on to the storage heap, so the pressure towards the centre and bottom increases, thus crushing and crumbling the large coke into breeze and dust. Storage coke contains a large amount of exterior dust, and needs severe "brushing" and careful grading on the screening plant. Experience has proved that storage coke, after exposure for three months in a heap under cover, will produce on screening up to 30 p.ct. by weight of dust.

However, it is essential that the demand for coke of any grade shall never exceed the supply; and at the same time arrangements must be devised by which large stocks of graded coke shall not be necessary. The hoppers themselves will carry the week-end production, and provide good stocks for the beginning of the next week. The problem of dealing with a production of coke in excess of local and outside demands could be solved to some extent, if not wholly, by the installation of an approved form of water gas or complete carbonization plant.

Alternatively, the financial side of a "ring" system of supply would need careful examination, under which gas undertaking A with low demand could supply undertaking B situated in an industrial area, and with an excessive local demand. By this means of combined supply, the present bogey of coke stocks could very easily be regulated. From the purely economical and inside point of view the complete carbonization plant appears to meet the case, and could be used very much as a safety valve to each individual undertaking; but this system would not assist the industrial area with a large demand.

At this point, it would be well to consider the question of coke oven supplies of fuel, which, however, in their present form would not be usable for anything but furnace purposes. The household fuel, as represented by carefully produced and efficiently screened and graded gas-works coke, will have no equal, and, in a very short time, few (if any) rivals. However, the matter must be tackled in no half-hearted manner; and in every case household fuel of guaranteed quality, from the ash, dust, and moisture point of view, must be produced at a reasonable price. In this way, not only will the coal fire be superseded to the nation's advantage, but the smokeless fuel of the future will be provided, and the coke market of England will be supplied and regulated from every English town.

SCREENING PLANT ON A SMALLER SCALE.

Fig. 5 shows an arrangement of screening plant on a smaller scale than that previously dealt with, which might be suitable

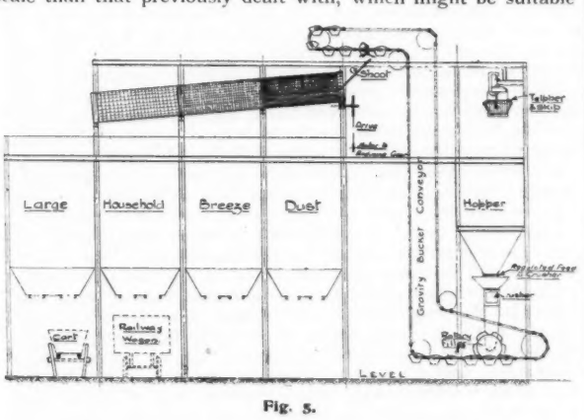

Fig. 5.

for the production of three grades of coke. A plant of this type would be capable of dealing with the coke on small and medium sized works; but the grades produced would require washing either by hand or mechanically, to remove the ash and shale content, which cannot be done by screening.

This arrangement has shown itself to be quite unsuitable for coke from modern installations of vertical retorts, due to the impossibility of keeping any grade clear from particles of shale, scurf, and ash. Washing by hand has proved unreliable, due to the responsibility of the human factor, and is also very costly, in addition to which the coke grades require double handling. However, with efficient adjustment of the crusher, this plant has been worked with some success on coke from horizontal retorts only, with hand washing of two of the four grades; but even in this case the household coke produced would not comply with the requirements of the future smokeless fuel.

As indicated, the coke from the retorts is transported, after quenching, either by telpher or hot coke conveyor, into an elevated hopper, beneath which a crusher of an approved type is arranged. The overhead telpher is the scheme usually adopted, although a coke conveyor would be more suitable from the point of view of careful handling of the coke. The cost of upkeep, repairs, and renewals of this form of conveyance has proved in almost every case absolutely out of the question when compared with the running costs of a telpher installation. The crusher selection has been dealt with previously; and the conditions are the same.

The coke from the crusher is elevated to a rotary screen arranged above coke storage hoppers, under which it is possible to load motors and carts by gravity. These hoppers might with advantage be of reinforced concrete; and the number of compartments is of course dependent on the grading decided upon by local demand. The question of the installation of mechanical washing plant for at least three grades will also require careful consideration, as without this a hand washery would be required to which the grades must be carted, unloaded, washed, and then loaded by hand.

The elevator question is worthy of careful consideration. The illustration includes a gravity bucket, safety-link, self-balanced conveyor, with which the running costs and power consumption are very light. Unfortunately, the initial cost is heavy as compared with the skidder-bar type of elevator—especially as a rotary filler must be included for efficient work. The alternative arrangement of a skidder-bar elevator involves much higher costs for running, lubrication, and power, and also tends to crush the coke again in the boot. The discharge from the head is also very acute, and tends to rush the coke into the screen. Very frequent renewals of skidder bars and wearing strips are necessary, and the chain is most certainly not of the safety-link type.

The remaining arrangement of this plant has been dealt with already. The screen is of necessity longer than screens

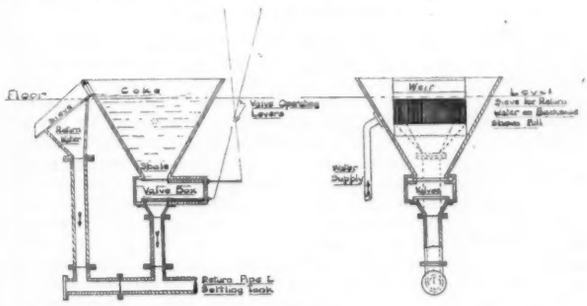

Fig. 6.

C and D in fig. 1, and no separate treatment is possible for large and breeze coke. As compared with the former installation, the results of screening on this plant are very poor, and no guarantees are possible. The finer grades are never quite free from dust, due to the lack of cascade treatment; and particles of shale and ash are frequently carried into each of the grades. It is absolutely essential that either mechanical or hand washing plant be installed, as coke that is screened and graded with the utmost care will never become popular as a fuel until every trace of shale and scurf has been removed.

COKE SPECIFICATION.

The following coke specification indicates slightly the requirements found necessary in a large industrial area:

System "A."

Large coke, screened and unwashed, 90 p.ct. to pass over 1½ in. square mesh.
Household coke, broken to apple size and screened, 85 p.ct. to pass over ½ in. square mesh and through 1½ in. square mesh.
Special breeze (unwashed) No. 1—85 p.ct. to pass over 1 1/16 in. mesh.
" " " No. 2—85 " " " ⅝ "
" " (washed) No. 3—80 " " " 7/16 "
" " " No. 4—80 " " " ¼ "
Dust, free from shale, 100 p.ct. to pass through ¼ in. square mesh.

These grades may be fixed by each undertaking; but a universal standard would be much the better plan if possible. The figures given as an illustration allow an ample margin from the producer's point of view, and give easy satisfaction to the public. The installation is also a financial asset, as reasonable prices may be obtained for the special grades. An average charge might be:

2s. per ton extra to the price of large coke for household coke
" " " " " " " unwashed special breeze
" " " " " " " washed " "

The prices quoted are obtained in a coke oven district, and in the face of keen competition from a patent smokeless fuel contractor.

For purposes of comparison it is interesting to note the

standards introduced by the London Coke Committee to suit the requirements of coke consumers:

LONDON COKE COMMITTEE STANDARDS.

Grade No. 1, large coke to pass over a 2 in. sq. mesh.
" No. 2, household coke, to pass through 2 in. and over ¾ in. sq. mesh.
" No. 3, forge coke, to pass through ¾ in. and over ⅜ in. sq. mesh.
Dust, to pass through ⅜ in. sq. mesh.

These grades make very fair comparison; but the No. 1 requirement of over 2 in. square mesh is almost impracticable with a crusher and cascade screen at work. Experience will prove that the grades must be smaller if efficient screening is to be obtained, and that washing or other form of mechanical separation is absolutely essential.

An average result from several tests of coke taken directly from the retorts and carefully screened by hand after passing through the crusher set to make No. 1 grade under specification conditions quoted as Scheme A, gave:

Grade No. 1	33·7	p.ct. by weight.
" No. 2	24·0	" "
" No. 3	29·0	" "
" No. 4	5·5	" "
Dust	7·8	" "
	100·0	

N.B.—These percentages include shale, scurf, ash, &c.

This very clearly indicates the difficulty of the screening process. When No. 1 grade coke is required, it is impossible to produce it without also making large quantities of Nos. 2 and 3, for which the demand may be small. Grade No. 2 or 3 may be produced without any No. 1, by an adjustment of the crusher. This difficulty is partially met by allowing an extra amount of storage capacity in the hoppers for these two grades; but, again, the position is regulated by demand.

Before concluding, it is necessary to state that very careful consideration is necessary in the selection of all metals for screen wires, chutes, and surfaces exposed to the action of the coke, which is an active erosive agent. Whenever possible, all cast iron and steel should be protected by renewable liners of some such metal as manganese steel. Screen wires should be built-up of extra quality wire, and the mesh arranged in squares made by the wires passing under and over the cross wire. Where necessary, efficient lubrication of all moving plant must be provided; and motive power should always be in excess of requirement factor, and, if possible, in duplicate. Wear and tear on all screening plant is always heavy, and specially prepared metals must be provided to withstand it.

The plant described in this paper combines selected features from several modern coke screening and grading installations, and is the result of careful experiment with many present-day systems. Each section of the plant received practical working trial—the chief object in view being the economical production of a household coke and a commercial smokeless fuel.

SECTION III.

In Section III. there were thirteen contributions which obtained awards of £10; and from these we commence this week to publish such portions as are considered necessary in view of the reproduction of the chief winning papers in our special issue of Nov. 9.

SALE AND UTILIZATION OF COKE.

By "AILEAN."

[JAMES M. A. MITCHELL, 76, Dilston Road, Newcastle-upon-Tyne.]

The general education of the public towards smokeless fuel is a big task, but it is in line with the growing belief in the advantages of fresh pure air and unrestricted sunlight, which is expressed in modern house and town planning, open-air schools, clinics, &c. Legislation dealing with domestic smoke is little likely in this country at present, but a great deal would be accomplished if the Government and local authorities could be induced to specify, for all housing schemes and subsidy houses, grates and ranges capable of consuming coke.

Essential as advertising and educational work are, however, the preparation is finally made effective by the selling of the apparatus and the selling of the coke. It would be too sweeping a generalization to say that the methods adopted by gas undertakings in handling coke apparatus should approximate to those employed by them in dealing with gas appliances; but all that has been learned in the latter connection should be examined, to see if it suggests anything useful for the former.

For instance, the close association of the gas stove appliance makers with the gas industry itself has certainly been of benefit to both; and though it is admittedly more difficult to co-operate with the forty odd firms making coke boilers, the salesman should at least be able to give the maker's specification and price of any boiler about which a consumer inquires, and be a source of information (and inspiration) to the boiler maker as to the type of apparatus likely to meet the demands in his area, and to suit the local water supply. The co-operation should extend to joint efforts to develop purely coke-using types of apparatus—grates and combinations, as well as independent boilers. Just as the modern gas fire, with its wide brick, shallow fire, pillar radiants, and single fuel bar, has evolved into a distinctive type, so the coke grate may yet have to attain a distinctive form of its own before reaching finality.

The greatest factor in the rapid development of gas sales has been the policy of the sale, hire-purchase, and hire of appliances by gas undertakings, and the stimulation, in many cases by "free" fixing. The difficulties with the plumbing and gasfitting trade in this connection have in general been overcome, either by sub-letting fixing work to them, or by paying them a trade commission on orders brought in by them to the showrooms, and encouraging them to use the undertaking's showroom for their customers as if it were their own, and to draw from the stocks at favourable trade prices.

Even the sale of coke appliances, however, raises further difficulties. The coke fireplace is purely a builder's job; and since a progressive undertaking will be in close touch with all the builders in its area, it will, if possible, have already persuaded them to put gas registers or built-in fires in all the bedrooms of new houses. And though specimens of coke grates suitable for the one or two solid fuel fireplaces that most builders insist upon may well be shown, the federated builder will probably be bound to purchase from certain builders' merchants, and a gas undertaking would be very unwise to gain inclusion in this list by agreeing to recognize only "Association" builders. The obvious procedure is to endeavour to interest the builders' merchants in coke appliances, and to induce them to bring their customers, the builders, to the showrooms.

With boilers a similar trading difficulty arises, complicated in some areas by continual demarcation disputes between hot-water engineers, plumbers, and gasfitters. Experience with gas appliances indicates that a policy, to be successful, must be at once bold, firm, and conciliatory. Gas undertakings must certainly, as regards their fittings departments, claim to rank as heating engineers, and be free to show, advise on, and if necessary fit, any type of heating apparatus for their gaseous or solid fuel. At the same time the hearty co-operation and friendship of the hot-water engineers must be diligently and persistently sought.

Free fixing, of course, is out of the question, and hire-purchase and hire would have to be taken as ordinary trade risks, without the special protection enjoyed under the Gas Acts. The issue of an explanatory catalogue of coke grates, combination sets, independent boilers, and small steam boilers suitable for the locality, is desirable, and might well be supplied to builders' merchants and hot-water engineers, overprinted with their name and address, and distributed to builders, plumbers, architects, housing authorities, &c.

The steam boilers at the gas-works should, if possible, be used as demonstration sets of the different types of forced draught furnaces suitable for coke burning; and those in charge of every electric power station and steam-power or steam-process plant in the area should be approached with an offer to negotiate a contract for coke to be sold on a calorific and ash and moisture content basis, and periodically provided with the latest published results of tests of comparable installations using either all coke or the "Sandwich" system.

Improvement in the design and construction of coke appliances is likely to be accelerated when they are handled by salesmen who are interested in their use as well as in their sale, and the small boiler, in particular, deserves attention in this respect at the present time. In the smaller sizes, the desideratum is not so much high efficiency on test as convenience in operation and adaptability to the circumstances of the household. In the small establishment with three hot-water taps and one bath, the coke boiler gives more hot water than is required, and consequently uses more than its fair allotment of the total fuel allowance. However, it is not suitable for intermittent working, and, unless kept burning all night, does not provide hot water first thing in the morning. This can be remedied by careful lagging of the storage cylinder and circulating pipes with non-conducting material; but this adds to the installation expense, and as the cylinder is generally used to warm either the bathroom or the linen closet, it is only pressing home the adage that "you cannot have it both ways," which is disappointing to the customer who has been led to expect abundance of cheap hot water. The basic difficulty appears to be that of the slow combustion of small quantities of coke in a tiny firebox with cold walls of metal of high conductivity. Twenty gallons of scalding hot water during the day, and another twenty gallons in the evening, is often as much as is required; and each of these can be got, at 33⅓ p.ct. efficiency, by the combustion of about 5 lbs. of coke. In these particular circumstances it would therefore seem desirable to sacrifice, if need be, the hot-water efficiency of the boiler in

favour of its capability of steady, continuous, slow combustion; and experiments with a boiler with firebrick lined firebox, and perhaps firebrick firebars, might be useful.

This leads us to the view that, though the boiler behind the sitting-room grate has a low efficiency, and may halve the radiating efficiency of the grate, it is still often the best economic proposition, considering the amount of hot water required, and the due apportionment of fuel among the different heating requirements of the household. Coal grates of this type vary very much in their practical working efficiency, and there is need for experiment to determine the most suitable design for use with coke. Points to be considered for such are: The flue-ways should be so designed that the dust will fall to points so provided for it that it will not immediately tend to choke up the passage, and can be readily raked out; there should be no acute interior angles in which fur would lodge, particularly at the front bottom corner, which is liable at times to be exposed to intense heat; the return pipe should be connected at the side of the boiler, near the bottom, and the tapping protected from the heat; and both flow and return pipes should proceed straight out to the side of the chimney breast (of course, with a suitable rise), and there be provided with either plugged tees, or unions, so that the boiler may be periodically flushed out without disturbing the setting.

The provision of cooking ovens to be heated by the "waste" heat from these, and from independent boilers, is not to be recommended—the work can be better done by the gas cooker. But a plate-warming oven and hot closet could be dealt with at economical flue-gas temperature and regulation, and would supply a want just where the gas cooker fails rather short.

A feature which should be built-in as standard to all independent coke boilers is a gas burner for ignition. A gas "poker" is useful, but if forgotten and left in after the fire has got well away, it deteriorates rapidly, the handle chars, and the flexible tube perishes. A burner can be fixed permanently beneath the front edge of the fire grate, with nozzles to direct one jet of flame between each two bars at an angle just above the horizontal, and so set as not to catch the falling ashes, or interfere with their removal from the ash pan. The tap should be in full view so that its "on" or "off" position can be determined at a glance, to avoid risk of the gas being kept on unnecessarily. Connection could be made from the gas cooker pipe, which is usually adjacent.

It is also worth considering whether the smaller boilers could be so made as to be readily convertible to gas firing in the summer months. The almost perpendicular walls of the water ways and the short flue travel present obstacles, but the use of a radiating type of burner (compare Main's "Konocoil" and Keith's patent drip-proof burner), or, perhaps, of luminous flat-flame burners, might be a solution. The igniting burner is a feature which might also be incorporated in coke fireplace grates. It means the laying of a service to the fireplace, which is a step in the right direction, and it familiarizes the consumer with the advantages of a gas service. It also meets the objection that if a coke fire is accidentally allowed to die down too far, it cannot be easily revived. A gas burner and the use of a sheet metal "blazer" to increase the draught will bring a coke fire up from cold to an almost white heat in a few minutes. Some attention to this little detail is worth while, for it is the sort of thing that is apt to be overlooked by those who are only familiar with demonstration coke grates in gas offices, where they are lit by the charwoman in the morning and maintained by the commissionaire throughout the day. In a home where no servant is kept, the housewife, going out for (say) the afternoon, gives a last glance around, and notices that the coke fire is nearly out. She piles it up with fresh coke, for a small quantity will not serve until her return, and leaves it to its fate. The mass of cold coke will probably be too much for it, and it will go out, in which case she will, on her return, have to unload and clean it before attempting to relight it. If it burns through, the heat of the fuel will have been more or less wasted on the empty room, in the uncertain hope of keeping the fire on. By the devices mentioned above, the difficulty is solved, and economy effected. A "blazer" suitable for a modern barless grate, projecting beyond the jambs, should be provided with wings, and preferably lined with asbestos, and fitted with an insulated handle. An objection to their use is that they are too unsightly, and get too hot, to remain with the fireside equipment, and must be removed to the kitchen after use. Some old-fashioned coal grates have a shutter made to slide up behind the canopy, and draw down to the hob when required, and a similar fitment is worth considering for the coke grate. A feature of an undertaking's "beginning of the season" coke selling campaign might be the offer of a gas poker to purchasers of a load of coke, and special terms for laying on the gas supply to it.

A growing field for coke which should be carefully watched is that of garage and greenhouse heating. This is an example of the heating field expanding through a rise in the standard of living; and the possibility of a hot-water radiator in the garage for the "11·9" may settle the question of an independent coke boiler in the kitchen of many a new "semi-detached."

The necessity for keeping data as to coke and coke appliances constantly before architects, consulting engineers, and manufacturers need not be laboured, particularly in view of the probability of fresh legal obligations as to warming and the provision of hot water being laid upon factory and workshop owners.

In the industrial field generally, the same readiness to give advice and to collaborate in the procuring of the most efficient apparatus that has characterized the gas sales side should be displayed in the coke sales activities.

In the actual selling of coke, a much greater freedom of action is possible than in the case of the sale of gas, and advantage should be taken of this to arrange terms and devise methods to suit the various classes of customers. To big steam raisers who can appreciate the method and check the tests, buying on a thermal basis, with allowance for ash and moisture content, will appeal. Some large institutions may be induced by favourable terms to buy their winter requirements during the summer, and put them into stock. Here, on the seller's side, must be balanced the advantages of money in hand and interest thereon, delivery at a slack season, saving in cost of stocking and deterioration, and possible fall in the market price, against the reduction in price necessary as an inducement, and possible rise in the market. The practice as to selling through coal merchants and agents varies in different districts, but one big agency is generally neglected. Local co-operative societies usually sell coal, and often run "coal clubs," whereby the coal is paid for more or less in advance. The offer of coke to them at a figure which would enable them to deliver it at a price which, with their dividend deducted, would give their customers some advantage by trading with them rather than by buying direct, would, if accepted, and the business established, reach a large circle of domestic consumers with whom it is otherwise difficult to get into touch. Of course there is no reason why gas undertakings should not run coke clubs themselves; but unless local sub-offices are available, the weekly journey to the central office is likely to be a deterrent. Local conditions have to be studied, to find the best method of reaching the working-class consumers; but, as has already been pointed out, they provide the biggest potential market, and one which, if at all well exploited, would guarantee such a steady demand as would not only wipe out the margin which has to be exported (for an attractive export market is not likely to be seen again), but tax the resources of the industry.

In some districts, probably the street hawker is still the best medium, for it must be remembered that the storage facilities in tenement property are often non-existent. Where a reasonable storage is available, but payment by instalments in advance is better for both parties, advantage might be taken of the slot meter and slot meter collector to add coke to the gas service. A simple coin box, registering the amounts inserted and the equivalent of coke paid for, could be secured either to the meter or meter cupboard (this for convenience and moral effect, as the money would remain the property of the consumer until the coke was ordered) and cleared, and delivery arrangements made, by the collector on his round. As orders for a district would thus be booked on one day, the resulting economy in delivery would enable smaller parcels to be supplied to suit customers' convenience. A house-to-house canvass explaining the method would have to be made, and repeated after the first batch had been persuaded and the "follow-my-neighbour" tendency started; otherwise the distribution of the coke money boxes would not be greater than that of the Post Office savings bank boxes. The educational work which could be done on the subject of smokeless fuel, and the economic use of fuel, through working-class organizations deserves careful study. All sorts of societies, from adult schools and women's temperance associations to I.L.P. clubs, are often hard put to get lectures for their quasi-educational series. The audiences might be small, but at each meeting will probably be found a few enthusiastic and intelligent individuals whose influence is well worth working for. The difficulty of providing the lectures would probably be found to be less than that of getting suitable lecturers, and tactful inquiry among undertakings staffs would probably secure the necessary introductions.

The sales organization required for these different activities will vary with the size of the undertaking, but in general it may be said that the word "residual" as including coke should be blotted out, and a unified department whose business it should be to sell "fuel" set up. The gas industry should set itself to become the medium for industrial and domestic fuel, gaseous and solid, only excluding (at the moment) metallurgical coke and the necessary importation of fuel oil and motor spirit; and its sales staff should feel capable of dealing with any demand for heat (speaking broadly, and excluding such special processes as require the use of the electric arc, for instance). A highly-trained staff is therefore essential, and some broadening of the present lines of technical training seems desirable.

To sum up, each gas undertaking should aim at becoming the fuel provider, and its sales department the consulting heating engineers, for its district; and in the process coke will gain from the public and the industry the consideration and the position which are its due.

SALE AND UTILIZATION OF COKE.

By "COCOANUT."

[Anonymous under Rule 7.]

To enable coke to be sold to advantage, it must be of a size suitable for the customer's particular requirements; it must contain a minimum of moisture and ash, be free from breeze, and be offered at a price comparing favourably with coal or any competing fuel. The means by which coke can be made to conform with these requirements does not properly come under this section. As regards price, a very good guide is to have due regard to its heat units in relation to competing coals, which will always control the price at which coke can be sold. The quantity of coke made for sale is small in proportion to the quantity of coal sold; and therefore the demand for coke will vary in ratio to the demand for coal, and the respective prices will vary in a similar ratio.

If, now, it is agreed that special steps should be taken to increase the sale of coke, it is suggested that a definite decision should be formulated in regard to the policy to be adopted. We must assume that, in regard to the preparation and handling of the coke, everything reasonable has been done to render the coke made a suitable fuel for the purposes for which it is to be sold. It is first necessary to adopt a definite policy in regard to coke sales, and in this connection it is recommended that the following steps should be taken:

1.—Adopt a policy of selling coke direct, and as little as possible through merchants.
2.—Appoint a coke manager or salesman, or in the smaller undertakings make some individual definitely responsible for coke sales.
3.—Provide delivery facilities.
4.—Decide upon the range of prices at which (*a*) unbroken coke, (*b*) No. 1 broken or domestic coke, and (*c*) No. 2 broken or forge coke is to be sold.
5.—Formulate a scale of discounts to large users, and also to merchants.
6.—Adopt a policy of making contracts over periods, and a determination never to fail such users.
7.—Settle upon maximum and minimum stocks of coke.
8.—Make a feature of selling coke stoves for water heating, greenhouses, and garages, and for hall and room heating, and show specimens of such stoves in the showroom.
9.—Offer to give advice in regard to coke utilization.
10.—Prepare literature explaining facilities offered by the gas undertaking for the sale of coke and appliances for (*a*) industrial use and (*b*) domestic use, and arrange for the distribution of such literature.
11.—Arrange advertising propaganda.
12.—Canvass all large fuel users.

Other points may occur to those studying this question; but there is little doubt that if steps of this kind were taken to deal with coke, the demand would be greatly stimulated.

To deal now in greater detail with the above suggestions.

1.—Unless coke is sold direct, it is difficult, and almost impossible, to keep control of the situation. A merchant is equally willing to sell coal or coke; and if no special effort is made to push coke, the buyer is almost certain to buy coal, which is so much better known than coke. Besides, the merchant usually prefers to sell coal, as he will frequently own railway trucks and a wharf or depot for the purpose of handling coal; and he naturally prefers to use his plant rather than to limit his possible profit to road delivery and sale only.

> If, on the other hand, a direct-sales business is conducted upon sound and energetic lines, there is no doubt that the sales of coke can be made to yield a higher return; for the merchants' profits are saved, and some indirect financial benefits are, or should be, obtained. There are, too, substantial advantages in retaining control of an important branch of the business. Gas undertakings are compelled to make coke irrespective of the demand. It is, therefore, of special importance that the means of selling it should be in their own hands. In this way additional efforts can be made to coincide with additional stocks, and such course of action can be intelligently pre-arranged according to the change of seasons and the variation in the make of coke from one year to another. On the other hand, a merchant could not be expected to take account of such things, and would probably take undue advantage of large stocks to embarrass the gas undertakings by ceasing his efforts at the very moment when a great effort was needed. By this means merchants can, and in some cases do, rig the market to suit their own ends.
>
> Assuming, therefore, that it is desired to conduct a large direct sales business, and, further, that the laudable ambition is entertained of selling locally the whole of the coke production, it should be realized that a good deal of effort must be forthcoming. That it should be necessary to sell a large surplus outside the district, and inside the district of another undertaking which has taken a great deal of pains to build-up a good local trade, casts a slur—and no light one at that—on the management. *

2.—It is a matter of considerable importance that a properly qualified official should be appointed to deal solely with coke sales in the medium and larger gas undertakings, while in the smaller concerns it should be made the responsibility of some particular individual. Only in this way can anyone acquire the necessary knowledge of coke, and of its sale, and of the actual and possible customers. This step alone would often solve the problem, as the right class of man would work out his own salvation, and make a success of the coke sales.

It needs very little argument to show that a coke salesman is absolutely justified. In some gas undertakings can be found large numbers of officials dealing solely with gas sales, with no one specially detailed to deal with coke sales. If a comparison is made of the revenue from gas and that from coke, it will be found that one or more coke salesmen are justified many times over—assuming, of course, and it is suggested rightly, that the number required to deal with the revenue from coke bears some proportion to that required from gas. Inability to dispose of coke in present circumstances frequently leads to large losses—such as making water gas instead of coal gas, when it is known to be more expensive—while at the same time the entire revenue from coke is enormously influenced by large stocks which must be cleared, practically at any cost.

Sufficient has been said, it is thought, to justify the appointment of a coke manager or salesman; and it is claimed that this is the most important step to take to deal with the coke situation in the great majority of gas undertakings.

3.—As regards the provision of delivery facilities, there is an undoubted advantage in the gas undertaking itself carrying out this work. With neat, well-kept vehicles, specially designed for the trade, and with the undertaking's name and the desire to sell coke prominently displayed, there is an advertisement of considerable value, not only for coke, but also for gas. In fact, it is difficult to estimate the value of such equipment. If, again, deliveries are made by carmen or contractors, it must be realized that the names and addresses of the concern's coke customers are being disclosed to an individual who may wish to do the business direct at some future date. Presumably there is also a profit to be made on the delivery, and therefore there is no occasion to present this to an outsider.

As regards the type of vehicles to employ for delivering coke, it is practically impossible to lay-down any hard-and-fast rule, the districts and conditions varying so greatly. For delivering by sack—though no one should use sacks when bulk delivery can be arranged—there is much to be said for the horse and van for short distances, and motors of varying sizes for the long distances and hilly districts.

> Certain deliveries will be cheaper by the one or the other, depending chiefly upon the distance of transit. Long journeys which can profitably be made by the latter would be prohibitive by the former; and with short journeys the opposite would be the case. Where the limiting line can be placed is not at all certain; but it will not be far from the 3 to 4 mile radius. The most unsatisfactory feature of the motor lorry is the amount of labour which must be sent to unload the coke; and in this respect it compares unfavourably with the unloading of the horse van by the carman. If insufficient labour be provided, the unloading will be inordinately long, and the daily tonnage output greatly decreased. It is a case of the finding of the happy medium. If the undertaking be sufficiently large, there is usually enough justification for employing both motor lorries and horse-drawn vehicles—suitable work being chosen for each type.*

Cost of delivery can be limited in many cases by the plan of arranging for delivery in full loads, for which facilities are readily forthcoming if the request is made. In such cases it is a paying proposition to make a reduction in the delivery rates to such customers. Delivery in bulk should always be arranged where possible, a considerable advantage being thereby gained at both ends, and in the output of work per vehicle and man. Bulk deliveries can be developed if an effort is made; and it is well worth the trouble involved. For delivery in bulk, motors of varying sizes and with tipping bodies are undoubtedly the type to employ; and for delivering coke the 1 or 2 ton fast-running motor van is specially suitable. For large customers, the 3 and 5 ton motor has advantages over those of smaller size.

4.—It is customary to charge a higher price for broken than for large coke; this being usually higher by 1d. or 2d. per cwt. This, of course, is based upon the cost of breaking and the loss occasioned by so converting coke into breeze. While such higher rate is justified, it does not follow that it is good business to make any differential charge of this sort. Oftentimes the effect it has is to induce customers, who know nothing of the purposes for which the two sizes are suitable, to buy the cheaper or unbroken coke, which for nearly all purposes is the least suitable. As a result the use of coke is abandoned by such customer, who, had he been supplied with a suitable size, might have become a regular user. It would therefore seem to be the best plan to charge one price for coke of all sizes, as is done by one large gas undertaking with a successful coke department. It is best to face the inevitable, and realize that unbroken coke is only suitable for firing in a deep layer—such as in producers, glass furnaces, &c.—and no other fuel-using appliances should be supplied with this size of coke. A definite policy of this kind would undoubtedly give satisfaction to many customers whose use of coke has been unsatisfactory in the past.

5.—A decision to give discounts to large users is advisable, as it helps to keep such customers and to promote sales. A

* See Gill's "Coke for Steam-Raising Purposes," p. 23.

* See Gill's "Coke for Steam-Raising Purposes," p. 31.

large user expects to receive some advantage over a small user; and he is likely to do business only with sellers who will give him such advantage. The scale need not be a high one, and may reasonably be limited to 2½ p.ct. and 5 p.ct., for stipulated quantities taken per month. To merchants the discount must be a higher one—10 p.ct. being usual.

6.—The making of contracts for coke is a course which has much to commend it. Both buyer and seller know their liabilities, and it assists them in making estimates of costs, &c. It tends to strengthen the position of the coke market; and if a large quantity of coke has been definitely sold, it greatly improves the position in regard to obtaining good prices for the remainder. The uncertainty of what demand there will be tends to induce the seller to accept lower prices than would be the case if a good deal were already sold. In quoting customers, it is important first to inspect delivery facilities, and to avoid some of the pitfalls which may well spell loss for the undertaking.

In naming the quantity to be sold, this should not be left indefinite by using the words "total requirements," as, if the price of coke rises during the contract period, a sale which it was thought was for a small quantity might well be increased to a high figure, as many customers are small coke users but large coal users, and it would be a simple matter, if coal became expensive, for the customer to use coke instead of coal, to the embarrassment of the gas undertaking in such circumstances. The quantity should be specified, or approximately so, by adding the words "10 p.ct. more or less," or by using the words: "Total requirements, 300 to 350 tons," or such figures as may be anticipated. Therefore:

Some suitable form of contract note should be used; and it is suggested that any or all of the following clauses should be printed thereon:

1.—Supplies may be wholly or partly suspended during the whole or partial stoppage of work at the collieries from which coal supplies are drawn, or of the railways, vessels, or other means whereby the coal is transported to the vendor's works.

2.—Supplies may be wholly or partly suspended in the event of war, strikes, lock-outs, accidents of all kinds, or from frost, snow, flood, fog, or any other occurrence whatsoever beyond the control of the vendors.

3.—Suspended supplies arising from any of the above-mentioned causes shall be delivered after the cause of stoppage has been removed at the contract rate of delivery; and this contract shall be extended to enable such suspended deliveries to be made.

4.—The vendors reserve the right to supply the purchasers from any of their works. (For undertakings with more than one works.)

5.—No sub-contract to be made on this sale.

6.—No complaint as to weight, quality, or quantity of the coke, or any part thereof, can be considered unless made at the time of delivery.

7.—Vendors to have the right to suspend or cancel this contract in the event of the purchasers failing to make the payments as above provided, or becoming bankrupt, or committing an act of bankruptcy; and if any such event shall happen, all the sum of money owing shall at once become due for payment.*

It is of the greatest possible importance that no customer with a contract should be "let down," even for a short time, as is sometimes the case where stocks of coke are allowed to run very low. This is a very bad practice, and does the coke market a great deal of harm. It will be dealt with more fully later.

In quoting customers for coke for no stated periods, too much care cannot be taken to ensure that important sentences, such as: "This price is subject to alteration (without notice or by giving — days' notice)," "This offer is subject to acceptance within — days from this date," and the three words "until further notice" are not omitted in error, for such omissions will often cause no end of trouble. This is an argument in favour of standard forms of letters, which can be made to save a good deal of trouble and mistakes, enabling an intelligent clerk to do the bulk of the work with a minimum of supervision.

7.—Nothing has done more to limit coke sales than the practice of failing customers by running out of stock. Continuity of supply is all-important to business concerns, which are so often badly equipped with storage space for fuel. This is short-sighted on their part, but at the same time it makes them very anxious to deal only with fuel suppliers who will not fail them. It is absolutely essential for a gas undertaking which intends to build up a good coke market to ensure that the coke in stock shall never fall below some well-considered minimum figure. How often one hears that such and such a works have no coke in stock. In such cases it is certain that some customer is suffering, though among some gas people it is supposed to be a creditable state of affairs. Far from this, it is surely a suicidal policy; and while it is not so serious as running out of stock of gas, it is something over which great pains should be taken to avoid. Calculations should be made of coke sales liabilities, and sufficient quantity should always be kept in stock for such liabilities.

It is seriously suggested that failure to keep coke in stock for regular customers is one of the important reasons that coke is not a popular fuel.

* See Gill's "Coke for Steam-Raising Purposes," pp. 38-9.

The necessity for deciding upon the maximum stock of coke does not need any comment.

8.—The pushing of coke stoves for the supply of domestic hot water is one of the most hopeful factors for dealing with the coke market. Thousands of these stoves are in use, and their popularity is growing apace. Every one of these stoves uses several tons of coke per annum; and with the rate they are growing, it can only be a question of time before their effect is clearly apparent to all coke suppliers. Considering that there is scope for one of these stoves in several million houses, and that each stove uses several tons of coke per annum, it is obvious that gas undertakings should do their utmost to push their sale, by displaying them in their showrooms, by distributing literature, and by calling the attention of architects, builders, and ironmongers in their districts to their suitability in the house. Gas undertakings should also lend their support to the manufacturers who make and advertise these stoves. It is a moot point, in the writer's mind, whether, considered broadly, the gas undertaking which sells a stove of this kind is not doing as much for the gas business as if it sold a gas heater instead for the same purpose.

There is obviously not nearly the same scope for garage and greenhouse coke heating stoves, and for other types used in halls and rooms, as there is for the above; but the coke to be thereby sold could be very tangible. To obtain such business, gas undertakings must, however, take the necessary steps to stock such stoves, and push their sale.

In connection with this matter of the coke hot water stove, there is little doubt that the London Coke Committee was an important factor in its success, and this Committee did much to support its development in the early stages, and to assist materially in the early sales of the apparatus. More will be said later on the question of the importance of combinations of this character in developing coke sales.

9.—Offering to give advice to users and prospective users of coke-burning appliances is a good, though obvious, means of fostering the use of the fuel. There is a good deal of truth in the belief that one good appliance will sell another, for one satisfied user will sometimes recommend what he has adopted to many friends; and so, after an early effort, sales are effected subsequently without much trouble. Much careful sowing of seed by giving good advice in the early stages will eventually enable a rich harvest to be reaped. It is, however, of little use to offer advice unless the advice is based upon experience; and this is another reason that emphasis has been laid above upon the importance of appointing a coke manager or salesman to look after the coke sales, and everything in connection with the matter.

10.—It is obvious that it is of little use to form a coke department unless the facilities thus offered are made clear to all who are likely to be interested. The hiding of one's light under a bushel is proverbially foolish. Literature explaining the value of coke, its suitability for various purposes, its price, and the facilities offered for delivery, with other such details, should be set out on leaflets and distributed in a similar manner to like literature dealing with gas, which is no difficult matter to gas undertakings.

11.—The arrangement of advertising propaganda is closely allied to that of preparation of literature, and would fall within the scope of the official appointed to deal with coke sales. No live sales department can expect to progress and increase its sales unless advertising is practised; and a gas undertaking is no exception to this rule.

12.—The canvassing of large fuel users, who are all potential users of coke, is an obvious step, which is nearly always a necessary preliminary to obtaining such a customer. However, it is of little use to interview large fuel users, unless the representative is himself familiar with the full possibilities of coke for industrial use. Experience of this kind cannot be gained without a good deal of practical work in the use of coke for such purposes. A similar difficulty is experienced in many gas undertakings which do not employ a properly qualified industrial gas salesman. An insufficiently equipped representative may well do more harm than good; and it is difficult indeed to suggest a practical means of filling this need, except on the lines contained in the suggestion at the end of this paper.

Utilization of Coke for Industrial Purposes.

For industrial purposes, coke can be used with considerable success for large and small boilers, both mechanically and hand stoked, for producers and deep bed furnaces of various descriptions, and, in fact, for nearly all purposes for which coal is used.

Boiler Fuel Market.

Any paper dealing with the utilization of coke would be very incomplete unless some detailed reference were made to the burning of coke in steam boilers. The boiler fuel market is so large in extent that, if coke were to supply but a small percentage only of the fuel used in boiler installations, there would never be any problem of coke disposal. This potential field for coke has several desirable features. Boilers can be found in most districts. They are very large users of fuel, both in winter and summer; and there is no question of gas competing for this business, thus giving coke a clear field.

For industrial use generally, coke has a substantial advantage

over coal, in that it is a smokeless fuel, and can be forced without fear of producing smoke. At the same time, having a low volatile content, it requires a strong draught to force its combustion to any extent. Containing but a small percentage of volatile matter, say, from 2 to 6 p.ct., fixed carbon from 75 to 85 p.ct., ash from 8 to 15 p.ct., and moisture from 2 to 10 p.ct., it can be a very high grade of fuel, or it can be of distinctly low grade, depending upon its ash and moisture content. To build up a good coke market it is necessary to cut out high-ash varieties of coal, and to keep the moisture content in the coke at not more than 5 p.ct., which is fortunately much easier than it sounds, and needs but a small though well-sustained effort to bring about.

For the mechanical stokers coke must be supplied of a small uniform size of under 1 in. It cannot be used on chain grate stokers which have been designed solely for the burning of coal, for it is necessary to provide for the ignition of a low volatile fuel, such as coke, directly it drops on the grate. This can now be readily done by transferring some of the heat from the main part of the travelling grate to the firebrick arch situated over the fuel inlet, igniting the coke by contact with this highly heated arch.

This has ceased to be any novelty for some years past, and there are now some hundreds of chain grate stokers burning coke and coke breeze exclusively without trouble of any kind.

There are other types of mechanical grates, though these are small in proportion to those of the chain grate type, but in all these other types coke can be burnt quite successfully, provided there is sufficient draught.

The "Sandwich" system, as invented by Mr. E. W. L. Nicol, is a practical way of blending coke with coal to produce a mixed fuel, thus counteracting the undesirable characteristics of one fuel by its admixture with another. Many coals are so high in volatile matter that it is impossible to force them without making large quantities of smoke. With the Sandwich system, by mixing the required quantity of coke or breeze with the coal, any tendency to smoke can be completely nullified.

The Sandwich system is merely an arrangement whereby a layer of coke or breeze, or other low volatile fuel, is introduced on a chain grate under the layer of coal, so making a sandwich of the fuel. By this means the volatile content of the mixed fuel can be varied and controlled as required.

This has been and is being used in a number of large installations of boilers with considerable success.

For the successful use of coke in Lancashire and Cornish boilers it is distinctly advisable to specify broken or screened coke, this being superior to large coke in a boiler furnace, for which purpose a comparatively thin bed of fuel is used. In such cases large coke leaves too much air space, and the efficient conversion of carbon to carbon dioxide is by no means certain unless a deep layer of fuel is always maintained.

Tests prove that a boiler fired on small coke will give considerably more steam than one fired on large coke. This being so, it is desirable to confine oneself to the smaller sizes of coke for this purpose.

As regards the amount of draught required for the burning of coke in boilers generally, it can be taken as a sort of axiom that wherever forced or induced draught apparatus has been installed and is working properly there is sufficient draught for burning coke to the capacity for which the boiler is suitable. That is a rough and ready way of dealing with this question.

In the case of boilers dealing with natural draught, it entirely depends upon the duty on the boiler whether or not coke will carry the load. It is difficult—almost impossible—to state in writing the conditions which are necessary to enable coke to carry a particular load.

It is advisable to be very chary of expressing a favourable opinion in all cases of natural draught on large steam boilers; for coke, unless pushed with draught, is inclined to behave as it does in a slow combustion stove. For this reason, forced or induced draught is highly desirable in cases where it is proposed to use coke. By this means, some reserve exists wherever an extra quantity of steam is required; and there is a margin to provide for the time when a bad consignment of coke is supplied.

No other practical problems arise in the burning of coke for steam-raising purposes; but attention should be directed to the following instructions, as published in Gill's "Coke for Steam-Raising Purposes."

Directions for Using Coke as Boiler Fuel.

1. Being a non-volatile fuel, coke must be fired on a different principle from bituminous coal.
2. The fuel should be fired to maintain an even thickness from door to bridge.
3. The thickness of the bed of fuel must depend on the size of coke, and should be approximately as follows:
   When using large coke—(say) 3 in. cubes—the fuel bed should be about 10 in. thick.
   When using smaller coke—(say) 2 in. cubes—the fuel bed should be about 8 in. thick.
   When using broken coke—(say) 1½ in. cubes—the fuel bed should be about 6 in. thick.
   When using forge coke—(say) ¾ in. cubes—the fuel bed should be about 4 in. thick.
4. A coke fire of the right thickness, when burning freely and correctly, should have the appearance of being of a red and yellow colour on top. If much blue flame is visible, the thickness it too great; while if it is of a distinct yellow, the fire is too thin.
5. All the air required for combustion should be admitted underneath and through the fire-bars. No air should be admitted through the doors, or through any smoke-consuming appliance at the back of the bridge.
6. Coke requires plenty of draught—more so than coal; so that it is advisable to make a special examination for air leaks between the brickwork and boiler at various points, through the damper opening, and through badly-fitting portions of the fire doors. Any cracks in the brickwork should be filled-in. An examination of this kind will frequently make all the difference between success and failure in burning coke.
7. A coke fire does not require poking or stirring up. It should be left to burn without any attention of this kind; the only exception being that at intervals a slice should be passed between the fuel and the fire-bars, to break-up clinker as it forms, so as to prevent it from adhering to the bars and from checking the admission of air.
8. The tools in use should be kept properly sharpened. In burning coke this is of more importance than when burning coal.
9. The intervals at which a coke fire should be cleaned will depend upon the ash in the particular coke that is being burnt, and the rapidity with which the coke is consumed. This will vary widely—(say) from 3 to 8 hours, according to circumstances.
10. In cleaning a coke fire the same methods should be followed as when cleaning a coal fire; but it is of the greatest importance that as little as possible of good coke should be drawn out with the clinker and ashes. Unless great care is exercised, it will be found that after the fire is cleaned there is insufficient hot coke to ignite the fresh fuel. (This is a common fault with stokers who are inexperienced in coke stoking.)
11. With a Lancashire boiler, when the load is on, a fair interval should be allowed between the cleaning times of the two furnaces, as it must be recognized that coke, like anthracite, being a non-volatile fuel, takes more time than bituminous coal to ignite and burn freely. With a Cornish boiler, when the load is on, it is advisable to clean at a time only one-half of the furnace.
12. It is unnecessary to use any coal at any time except when lighting-up a boiler from cold.
13. Fires may be banked-up quite satisfactorily with coke.

Producers and Deep Bed Furnaces.

The value of coke for this purpose is so well known to everyone concerned with gas-works that it is unnecessary to discuss the question, except briefly, and then only in relation to producers of a size smaller than those employed in gas-works. These small producers are used for a variety of purposes, but chiefly for making producer gas for driving engines. In using coke in this type of apparatus, it is only necessary to employ a correct size of coke; the smaller the diameter or depth of the fuel bed, the smaller is the coke required. Thus a depth of 1 ft. 6 in. with 1 in. coke will give the same sort of result in quality of gas produced as a depth of 3 ft. with 2 in. to 3 in. coke. Again, with small diameters of (say) 1 ft. 6 in. or less, small coke—broken coke size or smaller—should be used. Large coke used in small producers of such diameters will allow too much air to find its way through the fuel bed without being converted into carbon monoxide.

The spacing of the firebars should be proportionate to the size of coke being used, but in no case is it advisable for these to be less than ⅜ in. apart, ½ in. being better in nearly all cases, and certainly for broken coke size. For large producers ordinary gas-works practice would apply.

This question of size and spacing of firebars, apart from quality of coke, are the only important points to watch in the case of producers and deep bed furnaces.

Utilization of Coke for Domestic Purposes.

Coke can be a very useful and economical fuel in the house, and, as explained above, the now popular coke stove for the hot water supply is bound to bring coke into increasing use.

The quality of the coke and its size are the two main factors in making a success of these stoves. The size of the coke should be as nearly 1 in. as possible, and for this reason there is undoubtedly much to be said for dividing the London Coke Committee's broken coke—*i.e.*, the size ranging from ¾ in. to 2 in.—into two sizes, making these ¾ in. to 1¼ in., and 1¼ in. to 2 in.

These stoves require the minimum of attention, morning and night; and so long as they are kept replenished with coke, they are found to give complete satisfaction. What has already been said applies also to other closed stoves used in or about the house.

For open grates, broken coke is quite suitable so long as the fire is kept sufficiently full to give a thickness of about 8 in., and certainly not less than 6 in. It is claimed, and no doubt rightly, that such fires can be lighted exclusively with coke, wood, and paper; and this can readily be demonstrated. But it is doubtful whether the care required to do this successfully and with the necessary degree of certainty would be taken by those ordinarily responsible for lighting domestic fires. First

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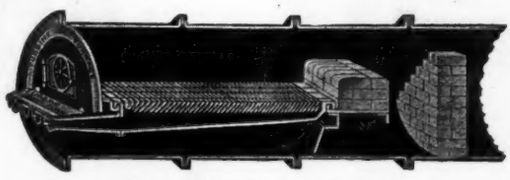

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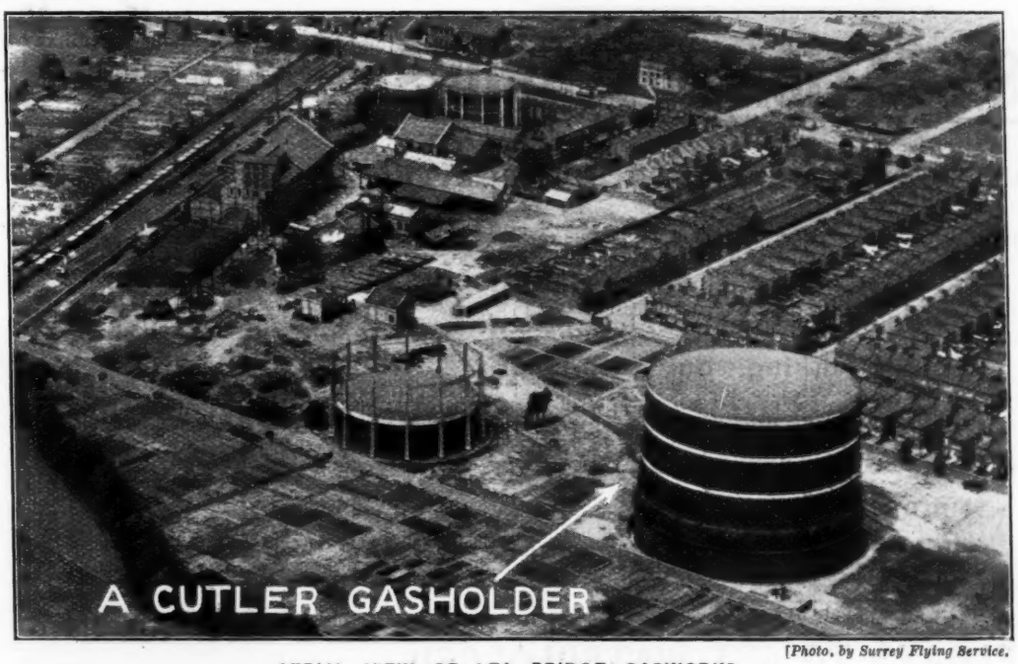

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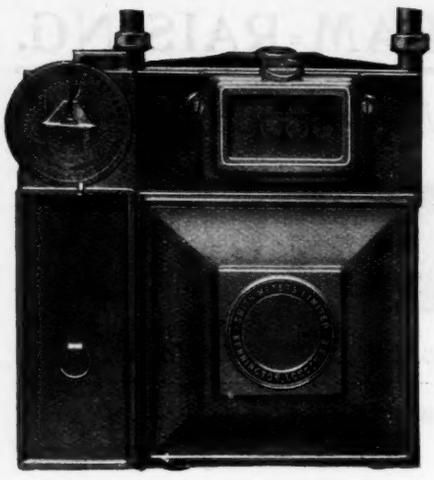

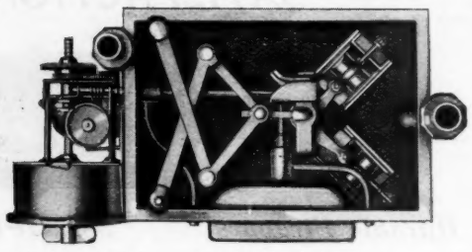

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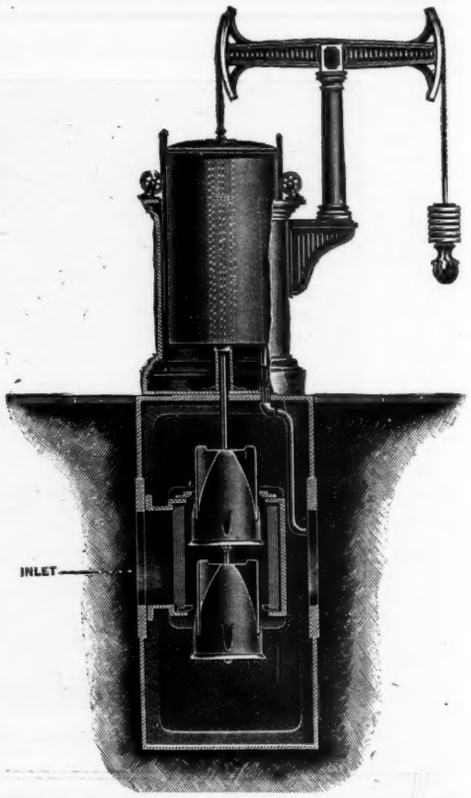

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lighting the fire with coal, with firelighters, or with gas is suggested as more certain.

Coke and its sale and utilization for all the many purposes for which it is suitable is sufficiently important and complicated to require competent persons to be placed in charge of this department of a gas undertaking's business, but few indeed have ever been given the opportunity to study this question, or to gain any commercial or practical experience in the matter. For this reason the author of this paper makes a suggestion, in the hope that some of the difficulties of improving the coke market may be overcome by co-operative effort.

The proposal to be made is, in spite of the number of Gas Associations which now exist, to increase their number by forming a Coke Research Association. The members of the Association would be drawn from makers of coke and of coke-burning appliances, and such other individuals as it might be advisable to include in their number. The objects of the Association would be to conduct research in methods of coke production, its preparation, sale, and utilization—to borrow from the headings of this competition.

It would be supported by its members on some basis to be determined; and it would conduct experiments, test and develop appliances, assist its members with advice, conduct tests and trials in their districts, and prepare literature and advertising propaganda for the use of the members. It would advertise coke and assist in exhibitions of an allied character, and maintain a standing exhibit of coke-using apparatus, and would adapt foreign coke-using appliances for employment in England. By such means, work of a useful character, and which at present it is no one's business to conduct, would be proceeding continuously, and great good should result.

It is a common criticism—and will no doubt be applied in this case—that so many Associations result in the attendance at a large number of meetings on the part of its members, so occupying—or wasting, it is sometimes said—too much of the members' time—or ,at any rate, of those forming the Committees. The answer to this criticism is that, if the proper officials are appointed, there is little need for more than few committee meetings, which might well be limited to one or two a year.

In drawing-up the above suggestions for stimulating the sale of coke, and for its utilization, it is clear that a number of the steps which it is suggested should be taken would be very difficult in the case of many gas undertakings, unless there was some clearing house for the distribution of advice and assistance. At the same time, it is hoped that a case has been made out for gas undertakings to pay much greater attention to the sale and utilization of coke.

SALE OF COKE FOR DOMESTIC PURPOSES.

By "COKALITION."

[H. M. DODIMEAD, of the Gas Light and Coke Company.]

The first and vital point to be appreciated by all who are anxious to create a good and steady demand for coke for domestic purposes is that there is no easy "royal" road to success. No short-lived intensive "stunt" is going to solve the problem. It will be a matter of inspired initiative, capable administration backed by sufficient funds, and hard work all the way.

A general demand for coke throughout the country—and that is the only kind of demand which will stabilize prices, prevent unexpectedly large accumulations from time to time, and put the business on a sound basis—can undoubtedly be obtained by:

(1) A well-organized national and local advertising campaign, using experienced writers and first-class artists—writers and artists who know how to "approach" women readers, architects, builders, and Government and local housing authorities.

(2) The formation of a coke sales staff of a capacity and size commensurate with the importance of this business.

(3) A greater use of showrooms and showroom windows for displaying the attractiveness and advantages of coke.

PUBLICITY.

A study of the existing comparatively small number of advertisements and publications relating to the use of coke for domestic purposes makes one reluctantly admit that coke publicity is in a very backward state. The following is the suggested basis for a national publicity scheme for creating a demand for coke.

A central coke publicity organization representative of the whole industry should be formed, with the minimum delay, for general coke propaganda purposes. Its members should be gas undertakings, makers of coke-consuming appliances, and other manufacturers who are directly or indirectly interested in the sale of coke. This central organization would be responsible for planning and carrying out a national publicity campaign in favour of the use of gas coke, and would also render all possible assistance to gas undertakings in any of their local efforts to popularize coke.

This national coke publicity scheme, to be fully successful from the start, should be based on an expenditure of at least 1 p.ct. per annum of the value of the coke produced each year throughout the country, *plus* a sum to be provided by coke apparatus manufacturers. This 1 p.ct. is a low figure—surpassed probably by every large store and by hundreds of firms who have special articles of clothing or food to sell. Should the coke section of the gas industry be behind the times in this matter?

It is suggested that the sum thus put aside by the gas undertakings should cover the cost of both national and local coke publicity—that is to say, half the money should be sent to the central coke publicity organization, and the other half should be used by the undertaking for local publicity work. No undertaking should be considered as being a "full" member of the central organization unless it does undertake to advertise locally as well as to send its ½ p.ct. subscription to the central coke publicity organization. This plan would undoubtedly mean that a considerable sum would have to be spent in local publicity. In this connection it would be part of the general service of the central organization to prepare advertisements of all kinds and sizes suitable for local use, and to give advice (when desired) on all matters connected with the allocation of the local publicity money, and so forth. Posters, leaflets, blocks, articles, &c., would be supplied by the central organization at the lowest possible charges.

The central organization would also arrange a continuous series of small travelling local exhibitions throughout the country, the cost of which would be borne partly by the central funds, partly by the local undertaking or undertakings (out of their ½ p.ct. local publicity funds), and partly by the manufacturers whose apparatus is shown at the exhibitions. Suitable posters, advertisements, and cards of invitation to be sent to consumers would be prepared by the central organization. These exhibitions could be made popular by various means—by including, for example, gas cooking demonstrations (the opportunity being taken, of course, to emphasize the value of an economical and ever-ready supply of hot water from the coke boilers, and their usefulness in such operations as simmering), and by simple competitions such as a "cross-word" puzzle, or a "postcard" competition in which local people are offered a coke boiler for the best coke slogan, or the best description, in not more than a hundred words, of the advantages of a coke boiler.

COKE SALES STAFF.

The formation of an efficient coke sales staff is another vital matter which must receive urgent attention. In nine cases out of ten I believe it is the fact that the local gas undertaking is less well equipped in the matter of its coke sales staff than are the local coal merchants. To look at it in another way, some undertakings which have (say) a hundred outdoor representatives to deal with the sale of gas, have just one or two men dealing specifically with the sale of coke; and more often than not these two men are kept in an office waiting for orders to turn up! Probably not one undertaking in twenty has a man or woman whose duty it is to go out among domestic consumers with the sole object of persuading them to use coke in their homes. Is this good business?

I believe the successful formation of a coke sales staff will depend on the choice of a number of well-educated, well-groomed men of perfect address who, after going through a course of training in the presentation of the coke proposition, will be capable of interesting all types of men and women in the question of the domestic utilization of coke. I believe we shall only get men of good capacity by offering good prospects.

We should have salesmen-demonstrators—that is to say, men (or women) who will not only canvass customers, but, after they have effected sales, make periodical calls on them to see that they are absolutely satisfied with the coke boilers, are using them in the best possible manner, and have no complaints to make regarding the size or quality of the coke provided.

My suggestion is, therefore, that every medium-sized and large undertaking should collect a thoroughly capable, well-trained staff (of sufficient size to meet local requirements) to sell and demonstrate the use of coke boilers; and that, as regards smaller undertakings, where the output of coke is not sufficiently large to justify the addition of a number of permanent well-paid men to their staff, it would be better for several such undertakings in a given area to combine in employing an efficient staff to give their services for so many days every month to each undertaking, rather than for each small undertaking to employ one or two poorly-paid and inefficient salesmen.

The preliminary training of coke salesmen is probably a matter which could be dealt with by the central organization. A centralized training such as this would result in all undertakings working on somewhat similar lines, which would obviously be for the good of the industry in general. In fact, it might be found practicable for this central organization to retain a staff of several salesmen-demonstrators for use in various parts of the country, as desired, on payment of the necessary fees by the local undertakings.

SHOWROOMS.

Every gas undertaking with coke to sell should, wherever

possible, set apart some of its showroom and window space for the display of coke boilers. These exhibits should not consist only of two or three makes of boilers exhibited on a stand, but of sections of attractive kitchens or sculleries—some with gas cookers and coke boilers side by side; others with coke boilers only set in tiled and less expensive forms of recesses. In every case where it is possible, these boilers should be shown in action. When the boilers are shown in windows, suitable showcards should always be exhibited to bring to the notice of passers-by the salient features of the boilers and of the use of coke for water-heating. These window exhibits of coke boilers can, of course, be varied from time to time. Other displays which could be staged are bathrooms, hot water radiators, and water-heated towel rails (with, of course, suitable showcards pointing out the connection between the coke boilers and the articles exhibited), and so forth. An attractive variation from the ordinary would be a small fountain throwing-up hot steaming water heated in a coke boiler.

There is nothing new in these suggestions. They are made, however, because, up to the present, comparatively little in this obvious direction has been done.

Again, in how many showrooms is there to be seen a really attractive coke fire? There are now on the market a number of coke grates which are not only efficient, but beautiful in design.

Another outlet for coke which is generally neglected from the point of view of showroom propaganda is the heating of greenhouses. A section of a greenhouse with both gas and coke boilers would make an attractive addition to many showrooms, and would draw much attention, if well staged occasionally in the showroom windows.

Contracts for the Supply of Coke.

From several points of view it would be a distinct advantage to coke departments if they knew in advance the approximate amount of coke which they would have to deliver each year to the majority of their domestic consumers. From every point of view it would be well for coke departments to obtain a written undertaking from every domestic coke consumer that he or she would order all supplies of coke required for (say) a period of two years from the coke department. Some such arrangement would tend to stabilize the demand, and facilitate the work of the coke department. Ultimately it would result in departmental economies.

I would suggest, therefore, that it would be a paying proposition to offer a series of small graduated discounts to domestic coke consumers as an inducement to them to sign a two-year contract for coke.* Their only obligation under the contract would be to take all of the coke they require direct from the undertaking during the period of the contract. In consideration of this, the gas undertaking, at the end of each year, would grant a discount based on the amount of coke ordered throughout the year. This discount would be deducted from the amount charged in respect of the last delivery of coke for the year. The price to be paid for the coke delivered on any date throughout the year, other than for the last delivery, would be at the rate prevailing at the time.

Let us assume, for example, that the following graduated scale of discounts for domestic "contract" consumers were adopted:

Amount of Coke Ordered During the Year.	Discount to be Granted.
Not less than 4 and up to 6 tons	5 p.ct.
Over 6 ,, ,, 10 ,, ...	6 ,,
,, 10 tons	7 ,,

With this basis of discounts, and with coke at (say) 45s. a ton throughout the year, it would undoubtedly be easy for a good salesman to prove the attractiveness of the offer by showing a 5-ton-a-year consumer that, when he sent in the order for the last of the 5 tons, instead of having to meet a bill of 45s., he would have to pay only 33s. 9d.—that is to say, 45s. *less* 11s. 3d. (5 p.ct. of £11 5s.).

If this plan is adopted, everything possible should be done to make easy the ordering of coke of the proper size. To ensure this, probably the best arrangement would be to have prepared books of tear-out "order" postcards for each grade of coke. A potential 5-ton-a-year consumer requiring that grade of coke would be given a book containing (say) six of these cards. His contract number would be put on each of the cards before they were handed to him. If thought desirable, the last postcard in the book could be of a slightly different tint, and this should be used for the last order of the year, so that the clerical staff of the coke department would know on receipt of it that they could base their discount on the coke ordered during the year up to the date of that order.

Even where consumers will not sign a contract, I think it would be a good plan to leave a postcard order book for ordering coke. Its presence in the house would be a continuous reminder to the householder that he had only to fill in the card, and post it, to ensure prompt delivery.

Suggested Improvements in the Coke Service.

One direction in which the service of some coke departments can, I think, be improved is in the use of an "acknowledgment" postcard containing an acknowledgment of an order for coke which does more than say that "the matter shall receive immediate attention." Most housewives find it a distinct convenience to know when they may expect delivery. Many women (and in particular those who are running the house without a servant) have to leave their houses unoccupied at certain times of the day, and it would therefore be a great help to them to know approximately when they might expect delivery, so that they could be in at the time. This arrangement would also prevent a number of fruitless journeys on the part of carmen who call on consumers, but who are unable to make delivery owing to the consumers being away from their houses at the time of the calls.

Quality of Coke.

However well organized the coke-selling side of the business may be, equally careful attention must be paid to the delivery of the coke. Undoubtedly much remains to be done in some cases as regards the condition in which the coke is delivered. In this matter some of the most progressive undertakings will admit that, even in their cases, there is room for improvement. I recently saw a ton of coke (from a large gas undertaking) which had been in the cellar of a consumer for about two days. The cellar was "in flood." The water from the coke completely covered the floor of the small cellar to a depth of nearly half-an-inch. The consumer naturally asked whether it was right that he should be expected to pay at the rate of 45s. a ton for water. Incidentally the water had made the coal at the other side of the cellar very damp.

Clean Delivery.

Another point to be attended to is the equipment of the coke carters with all the tools necessary to give a clean delivery of coke without worrying consumers. No carter should have to borrow from consumers a spade to do a little trimming in the cellar, a tool to lever up the lid of the coal shoot, or a broom with which to sweep up after completing delivery.

Frequent Cause of Dissatisfaction.

Connected with deliveries, there is a further detail from which dissatisfaction may arise if the matter is not attended to. In delivering coke, the carter should in every case, immediately on arrival, give a delivery note or bill to the consumer stating not only the quantity of coke he has to deliver, but the number of sacks. A recent delivery by a carter of a ton of coke to my house consisted of thirteen sacks, and on my arrival home my wife asked me whether thirteen sacks went to the ton. These doubts as to full weight delivered should not be allowed to enter consumers' minds.

Price of Coke.

If we could create a steady domestic demand in this country for the bulk of our coke, we should soon be able to reduce our prices, to stabilize our charges for coke to consumers over periods of not less than six months, and to promise them that, no matter how attractive offers from abroad might be, we would not let that prevent our supplying home demands first at the figure decided upon. And in doing this, the average price per ton of coke obtained would probably be quite as high as, or even higher than, that which we could obtain in any other combination of markets.

Our coke department must build up a reputation at home for never-failing supplies, for an excellent all-round service, and for ensuring an absence of large fluctuations in price—in fact, a reputation similar to that which we have built up in connection with our primary product gas. Then the coke problem will be near a final solution, and we shall have the satisfaction of knowing that, as citizens, we have taken a further important part in the reduction of the smoke curse and the serious waste which is now taking place of our most important national asset—coal.

Glossary of Illumination Terms.—The British Engineering Standards Association have just issued a "Glossary of Terms Used in Illumination and Photometry" (Publication No. 233-1925) which should prove of considerable assistance to all interested in this subject. These terms have been approved by the National Illumination Committee of Great Britain, and are in accordance with the decisions of the International Illumination Commission as far as such decisions are applicable. The glossary covers a wide range of terms; and where there are two terms in use for the same definition, the preferred term is given in heavy type and the synonym in lighter type. Copies are obtainable from the Publications Department of the Association, No. 28, Victoria Street, Westminster, S.W. 1; price 1s. 2d., post free.

* NOTE: This principle of making coke contracts obviously need not be limited to the domestic side of the business. It is equally applicable (with variations in detail, of course) to bigger contracts; in fact there is, I believe, no good reason why up to (say) 80 p.ct. of the total production of coke by an undertaking should not be sold under contract.

GAS BILLS FOR 1926.

Judging from present indications, it appears improbable that the requirements of the gas industry in the direction of Private Bill Legislation will impose a great deal of work upon Parliament during the present year; there being only a dozen or so measures to be dealt with.

The ASCOT DISTRICT GAS AND ELECTRICITY BILL is mainly a financial one. The Company were incorporated by an Act of 1882, which authorized them to supply gas in a number of parishes in Berkshire and Surrey. A later Act, passed in 1906, extended their gas limits, and empowered them to supply electricity in a specified area. The paid-up capital amounts to £140,000, in 10 p.ct. original shares, 7 p.ct. additional ordinary shares, and 6 p.ct. preference shares; and the sum borrowed to £70,000, in 4 and 4½ p.ct. perpetual debenture stock and 8 p.ct. terminable debenture stock. These figures represent the total amounts of capital and loans authorized. The demands for gas and electricity in the Company's area of supply continue to increase; and to meet them, further money is needed. The Company seek by the Bill power to raise from time to time additional capital not exceeding in the whole £60,000 (including premiums), by the creation and issue of new ordinary shares or stock or new preference shares or stock, or both. The maximum dividends named for this additional capital are 7 p.ct. on ordinary capital and 6 p.ct. on preference capital. The auction clause is in the terms of the Model Bill; but authority is asked to offer, during a period of two years from the passing of the Act or such extended period as the Board of Trade may allow (and subject to such conditions as the Board of Trade may think fit to impose), capital for subscription, and to pay commission—this commission not to exceed 5 p.ct. The borrowing powers desired are one-half of the additional capital authorized. Preference and debenture stock may be redeemable. There is provision for the appointment of a Managing-Director or Managing-Directors; and some clauses of a usual character regulating the supply of gas are included. [*Parliamentary Agents: Messrs. R. W. Cooper & Sons.*]

The BARNET DISTRICT GAS AND WATER BILL relates to both branches of the Company's undertaking. The Company were incorporated under an Act of 1872; and further powers have been subsequently conferred upon them. They desire now to acquire additional lands for the purposes of the two undertakings, to carry out new water-works between the date of the Act and Jan. 1, 1940, to purchase the Hatfield Water-Works by agreement, to extend the water limits, and to substitute for the existing ones new provisions for charging for water supplied in their district, and for supplies by meter to the Finchley Urban District Council and to the East Barnet Valley Urban District Council. They also ask for power to use lands described for gas-works purposes, and to charge for gas supplied by meter prices not exceeding in the urban districts of Barnet, East Barnet Valley, Enfield, Finchley, and Friern Barnet 12·5d. per therm, and in the remainder of the gas limits 16·5d. per therm. A number of usual gas clauses and the agreed "relief from obligation to supply" clause are included. The standby charge is not to exceed 25s. for any one quarter. It is proposed to convert the whole of the "A," "B," and "C" 1872 stocks (amounting to £135,000) into £194,857 of ordinary stock of one and the same class. This stock will be divided among the holders of the stocks named in the proportion of one and three-sevenths pounds for every £1 now held. The £295,000 of 7 p.ct. "D" stock issued is also to be consolidated with this new ordinary stock, so that all ordinary stocks shall form one class. Power is sought to raise the further amount of £70,000 which the Company are entitled to raise for the water undertaking, and to apply the proceeds to the water or the gas undertaking, as they may determine. Further borrowing powers are also suggested. There is an auction clause, and also provision for offering stock to consumers and employees "at the then value thereof," and for subscription by the public, together with the payment of a commission not exceeding 5 p.ct. Profit-sharing clauses appear in the Act. [*Parliamentary Agents: Messrs. Rees & Freres.*]

The CHORLEY CORPORATION BILL is to confer upon them further powers in connection with their several undertakings. In the part relating to gas a number of usual clauses are included. The Corporation wish to have their limits for the supply of gas defined. The additional charges stated for prepayment meter supplies are 10d. per 1000 c.ft. for hire of meter and fittings, or 1s. per 1000 c.ft. if the fittings include a cooker; and for a prepayment meter without fittings 6d. per 1000 c.ft. or 10 p.ct. per annum on the cost of the meter, whichever shall be the higher. Specifications made by the Corporation with regard to the minimum size and the material of pipes and fittings to be installed by the owner or occupier of any premises are to be approved by the Board of Trade, who, before giving such approval, may refer the matter to an independent gas engineer, and may, if they think fit, direct such engineer to hold a public inquiry. Copies of approved specifications are to be kept for public inspection at the gas office, and to be purchasable by any person at the price of 6d. each. Notice is to be given to the Corporation (for their approval) when pipes or fittings are to be installed, together with particulars as to size, materials, &c.; and the Corporation are to have right of inspection. Premises of a railway company (not being a dwelling house or appurtenant to a dwelling house) are exempted from the provisions of this section. The clause relating to power to compel repairs of piping or appliances in a dangerous condition is in the same terms as the one inserted (in substitution for another in the original Bill) in the Rochdale Corporation Act of last session (see "JOURNAL" for Dec. 30, p. 845). In another part of the Bill there are provisions relating to the sale by weight of coke in amounts exceeding 2 cwt. In such cases there is to be a weight ticket or delivery note; while coke sold from vehicles in quantities exceeding 14 lbs. but not exceeding 2 cwt. is to be in sacks "with a metal label affixed to the top of every such sack indicating the correct legal weight or measure of coke therein." [*Parliamentary Agents: Messrs. Lewin, Gregory, & Co.*]

The DARWEN CORPORATION BILL contains a few clauses for regulating the supply of gas. One of these is to confer power upon them to supply gasfittings, &c. [*Parliamentary Agents: Messrs. Sherwood & Co.*]

The GAS LIGHT AND COKE COMPANY'S BILL is to confer additional borrowing powers upon the Company, and for other purposes. By their Act of 1925 (which was reviewed in the "JOURNAL" for Dec. 23, p. 780), the Company were empowered to provide any moneys required for the redemption of mortgage bonds of the Brentford Gas Company or of certain redeemable debenture stock to be issued by the Company to holders of redeemable debenture stock of the Brentford Company by borrowing on mortgage or by the creation of debentures, ordinary stock, or preference stock. The Company have, however, determined not to exercise the powers of raising money by the issue of ordinary or preference stock, so desire that these powers should be repealed, and that they should be authorized to borrow sums not exceeding in the whole one-half of the nominal amount of the issued capital. Any debenture stock created under the powers of the Act may be redeemable.

A section referring to dividends on the ordinary stock is to the effect that if and whenever under already existing provisions "the rate at which the dividend actually payable to the holders of the ordinary stock of the Company in respect of any half-year would be less than 5 p.ct. per annum, the Company or the Directors (as the case may be) may declare and pay out of any moneys available for the purpose a dividend on the said ordinary stock at any rate not exceeding 5 p.ct. per annum, provided that, in addition to such payment, there be set aside as a contribution to the redemption fund referred to in section 9 [of the Act of 1903] such a sum (if any) as would, under the provisions of that section, as amended by this Act, be required to be set aside in relation to the dividend so declared and paid." The ordinary stock of the Company amounts to £18,839,124. As to dividends on the 3½ p.ct. maximum stock: "Sub-section (3) of section 34 (reduction of standard price and amendment of enactments relating to sliding-scale) of the Act of 1909 shall be read and have effect as if the paragraph commencing with the words 'In any half-year' and ending with the words 'shall be reduced by 1s. 8d.' were omitted from that sub-section." [*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

The HALIFAX CORPORATION BILL contains a part relating to their gas undertaking. This provides that the price of gas by meter shall not exceed 1s. 3d. per therm. The charge for the hire of a prepayment meter and fittings shall not exceed 3d. per therm if a cooker is included, and 2·5d. per therm if a cooker is not included. For a prepayment meter alone the hire shall not exceed 1·5d. per therm or 10 p.ct. per annum on the cost of the meter, whichever shall be the higher. There is provision for a revision of the price of gas. The calorific value is fixed at 400 B.Th.U. The clause relating to specifications with regard to the minimum size and the material of consumers' pipes and fittings is on the lines of that in the Chorley Corporation Bill, as is also the one giving power to compel repairs of piping or appliances, &c., in a dangerous condition. The Corporation desire power to refuse to supply gas to any person whose payments for either gas or electricity, or meter rent, or for the purchase or hire of gas or electrical stoves, fittings, or other appliances, are for the time being in arrear. [*Parliamentary Agents: Messrs. Lewin, Gregory, & Co.*]

The HORLEY DISTRICT GAS COMPANY (ELECTRICITY SUPPLY) BILL is to empower the Company to supply electricity, and for other purposes; and is on very similar lines to that promoted by them last year. The preamble sets out that the Company "could conveniently and economically work and maintain an electricity undertaking jointly with their gas undertaking; and it is expedient that the Company be empowered to supply electricity for public and private purposes within so much of their limits as is not included within the area of supply of the Sussex Electricity Supply Company, Ltd., as defined by the Crawley and District Electricity Special Order, 1924, together with so much of the parish of Nutfield, in the county of Surrey, as is

not within the Company's said limits for the purpose of facilitating the obtaining of a supply of electricity in bulk from the County of London Electric Supply Company, Ltd. The Bill provides that on part of the land on which they are now authorized to manufacture gas they may erect and use a station, works, and buildings for the generation, transformation, and distribution of electrical energy, and for making, working-up, converting, and storing any materials or residual products resulting from, or used in, the generation of electricity by them; but the section shall not relieve them from the necessity of obtaining the consent of the Electricity Commissioners to the establishment of a new, or the extension of an existing, generating station. The Company are to be specially authorized to break-up the streets or parts of streets, not repairable by the local authority and the railway, which are mentioned in a schedule; and they shall within a period of one year after the passing of the Act lay down suitable and sufficient distributing mains for the purposes of general supply throughout the streets and parts of streets mentioned in another schedule, unless the Electricity Commissioners shall extend the period for the purpose of enabling the Company to take a bulk supply of electricity from the County of London Electric Supply Company. The maximum prices which may be charged by the Company are—(*a*) in respect of the quarters ending March 31 and Dec. 31, for any amount up to 15 units 12s. 6d., and for each unit over 15 units 1od.; and (*b*) in respect of the quarters ending June 30 and Sept. 30, for any amount up to 10 units 8s. 4d., and for each unit over 10 units 1od. The additional capital which the Company seek power to raise for the purposes of the electricity undertaking is £30,000, with borrowing powers up to one-half this additional capital. Separate capital and revenue accounts are to be kept of the gas undertaking and the electricity undertaking; and the Company shall, out of the capital raised under this Act, carry to the credit of the capital account of the gas undertaking a fair proportion of the value of all land and buildings acquired or erected for the purposes of that undertaking and used also for the purposes of the electricity undertaking. The expenses of direction and management and others common to both undertakings shall also be apportioned between the separate accounts. Power is sought to enter into agreements with other companies as to supply of electricity in bulk or otherwise, and to change the name of the Company to the Horley District Gas and Electricity Company. [*Parliamentary Agents: Messrs. R. W. Cooper & Sons.*]

The MYNYDDISLWYN URBAN DISTRICT COUNCIL BILL includes a number of gas clauses of a general character. A section relating to prepayment meter supplies is to the effect that the Council may charge for gas supplied through a prepayment meter a minimum sum in each quarter (including therein the charges for the hire of any prepayment meter and fittings) not exceeding 7s. 6d. in respect of the quarters ending on Dec. 31 and March 31, and 5s. in respect of the quarters ending on June 30 and Sept. 30. [*Parliamentary Agents: Messrs. Rees & Freres.*]

The SWINDON CORPORATION BILL is to confer various powers. There is provision as to gas meter testing, in a clause authorizing the Corporation, at any time after the passing of the Act, to adopt, by resolution, the Sale of Gas Acts, 1859 and 1860. Another clause is to the effect that "every person who negligently or wilfully breaks, throws down, or otherwise damages any public lamp or lamp-post . . . shall make full compensation to the Corporation for the damage done, and the amount of such compensation, to an amount not exceeding £20, shall be recoverable summarily as a civil debt." [*Parliamentary Agents: Messrs. Martin & Co.*]

MISCELLANEOUS.

The LONDON COUNTY COUNCIL (GENERAL POWERS) BILL has in it a lengthy section dealing with the sale of coal. This begins: "It shall not be lawful for any person to sell coal in the county containing an undue proportion of slate or slack or incombustible matter; and if any person contravenes the provisions of this section, he shall be liable on summary conviction to a penalty not exceeding £10." Power is asked to stop vehicles and enter premises for the purpose of inspecting and taking samples of coal, and to require the owner or person in charge, or the occupier of premises, to furnish reasonable information with respect to such coal. [*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

The NEWCASTLE-UPON-TYNE CORPORATION BILL—which deals with a number of different matters—provides that where coke is sold by weight in quantities exceeding 2 cwt. the seller shall deliver to the purchaser a weight ticket. The seller or person in charge of any vehicle from which coke is sold by weight in quantities exceeding 14 lbs. shall carry on such vehicle a weighing instrument or suitable measure of a type approved by the Corporation. Quantities between 14 lbs. and 2 cwt. are to be sold or offered for sale in sacks with a metal label affixed to the top of each indicating the correct legal weight or measure of coke therein. Purchasers of coke by weight, as well as inspectors, may require the weighing or re-weighing of coke and vehicles carrying it. [*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

PROVISIONAL ORDER.

The DUNDEE CORPORATION PROVISIONAL ORDER is to transfer to, and vest in, the Corporation the undertakings of the Dundee Gas Commissioners and the Dundee Water Commissioners; to make provision with respect to the borrowing of money for, and the management of, the finances of the Corporation; and for other purposes. By an Act of 1868 the Dundee Gas Commissioners were incorporated for the purpose of supplying gas to the city and suburbs, and places adjacent thereto, with power to levy a gas contingent guarantee rate from occupiers within the city; and in 1894 the Corporation were constituted the Commissioners for carrying the Dundee Gas Acts into execution. It is now thought that it would be of advantage if provision were made for transferring to the Corporation the undertaking and the powers of the Dundee Gas Commissioners and the Dundee Water Commissioners, and for the borrowing by the Corporation of money generally, instead of in separate sums under the various Acts. Nothing done under the Order is to affect any annuity granted by the Commissioners under the Gas Acts or the Water Acts. [*Parliamentary Agents: Messrs. W. Robertson & Co.*]

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Does the Gas Industry Need Overhauling?

SIR,—The heading of the leading article in your issue for Dec. 9 asks "Does the Gas Industry need Overhauling?" Anyone reading the speech of the Prime Minister, delivered at Birmingham, will realize that there is only one answer. It does, and quickly!

Many small undertakings already feel the strain of competition due to the activities of the Electricity Commissioners, and the position will be anything but hopeful when they meet the full force of competition from an industry under Government control. Large gas undertakings—say, about 150—might be able to meet the new conditions with equanimity. What about the remaining 700? Are they to be abandoned to the car of Juggernaut?

It is puerile to think that action under the Gas Regulation Act will meet the situation. The Regulation Act served its purpose in 1921 and 1922. Local authorities owning gas undertakings still avoid adoption of the Act; those who have adopted it derive little advantage from the facilities it professes to confer.

Personal prejudice and parochial politics render nugatory the permissive powers of amalgamation.

The practical administration of clause 1 is funny.

The Act needs revision. Why not amend it on the lines of the Government's programme for electricity supply, and so enable the rank and file of the gas undertakings of the country to meet their competitor on fair terms?

"X."

Jan. 16, 1926.

Oil Filming of Water Surfaces.

SIR,—With reference to Mr. E. F. Keable's article on the subject of "Oil Filming of Gas-Works Water Surfaces," we had the privilege of co-operating with this gentleman and of carrying out the laboratory work connected with the experiments.

We should be interested to learn whether any of your readers have experience of any actual cases of unprotected tanks freezing while neighbouring tanks which were oiled remained free from that trouble. It is quite likely that the oil's function is just as important because it hinders evaporation, and so reduces the effect thereof, as on account of its direct blanketing or insulating property.

ALEXANDER DUCKHAM & CO., LTD.

6, *Broad Street Place,*
London, E.C.,
Jan. 13, 1926.

Successful Year at Tiverton.—The Tiverton Town Council have adopted the Finance Committee's recommendation to apply for sanction to borrow £2000 to cover the cost of laying new gas mains. In consequence of the increased output of gas, and the difficulty of providing an adequate supply in various parts of the town, the Lighting Committee considered it was necessary to carry out this scheme. The same Committee reported successful working of the gas undertaking, and recommended that the salary of the Gas and Electricity Works Manager (Mr. T. W. E. Corrigan) be increased.

MISCELLANEOUS NEWS.

SOUTH SUBURBAN COMPANY'S STANDARD PRICE.

In a report prepared for presentation to the London County Council at their meeting yesterday, the Public Control Committee referred to the Council's application to the Board of Trade for an Order reducing the standard price applicable to the South Suburban Gas Company, in consequence of the fall in costs. They pointed out that the present standard price is 15d. per therm, and the charge to consumers 11d., and that the Company admitted in their representations to the Board of Trade "that a *prima facie* case can be shown for some reduction of the present standard price."

As a result of the Council's application, the Board of Trade held a public inquiry on Nov. 3, which was presided over by Mr. J. F. Ronca, Director of Gas Administration. The Council were represented by Mr. Rowand Harker. The Croydon Corporation supported the Council's application. At the outset of the proceedings, Mr. Tyldesley Jones, on behalf of the Company, stated that a revision of the standard price under the proviso to section 1 (3) of the Gas Regulation Act would, if the view of that proviso which he understood was held by the Council were accepted, do a serious injury to the Company. He therefore asked for an adjournment to enable the Company to decide whether they should promote a Bill in Parliament dealing with the question of standard price, or whether they should apply to the Board of Trade for a Special Order under section 10 of the Gas Regulation Act. This section is in wider terms than section 1 (3), and would allow other circumstances to be taken into account than in the case of an application under section 1 (3). The Board, with the assent of the Council's representative, adjourned the inquiry until the 28th inst. The Company have now made an application under section 10 of the Act for a Special Order. Clause 4 of the draft Order provides for the fixing of a standard price of 13d. a therm (as compared with the present standard price of 15d. a therm). Clause 5 provides, in effect, that there shall be no further revision of the new standard price at an earlier date than Jan. 1, 1931.

Having regard to all the circumstances, the Committee recommended that the application of the Company for a Special Order be opposed, and that such opposition be based on the grounds (i) that the conditions now prevailing do not justify so high a standard price as that proposed, and (ii) that it is undesirable that the Company should be granted exemption, as proposed, from the provisions of section 1 (3) of the Gas Regulation Act, 1920.

BRITISH INDUSTRIES FAIR.

Preparations for the forthcoming British Industries Fair, to be held in London and Birmingham, from Feb. 15 to 26, are now well advanced.

Nearly 250,000 sq. ft. of space has been booked; and a large number of overseas buyers have already intimated their intention of visiting the Fair, which there is little doubt will be one of the most successful of the series.

Included in the list of exhibitors in the Birmingham Section are the following firms:

Aerograph Company, Ltd., 43, Holborn Viaduct, London, E.C.
W. & T. Avery, Ltd., Soho Foundry, Birmingham.
Babcock & Wilcox, Ltd., Winchester House, Victoria Square, Birmingham.
Birmingham Corporation.
Bowen Instrument Company, 9, Newton Road, Leeds.
George Bray & Co., Ltd., Gas Lighting Engineers, Leeds.
British Monomarks, Ltd., 19, Abingdon Street, London, S.W.
Bulpitt & Sons, Ltd., Camdon Street, Birmingham.
W. Canning & Co., Great Hampton Street, Birmingham.
Cannon Iron Foundries, Ltd., Deepfields, near Bilston.
Thos. Chatwin, Ltd., Victoria Works, Birmingham.
Crossley Bros., Ltd., Openshaw, Manchester.
Falkirk Iron Company, Ltd., Falkirk.
Gibbons Bros., Ltd., Dibdale Works, Dudley.
Glico Petroleum Company, Alexandra House, Queen Square, W.C.
Hewitt Construction Syndicate, Ltd., 39, Victoria Street, S.W.
Incandescent Heat Company, Ltd., Cornwall Road, Smethwick.
Industrial Research Laboratories, Council House, Birmingham.
Light Castings, Ltd., Corporation Road, Audenshaw, Manchester.
Midland Fan Company, Ltd., 212, Aston Road, Birmingham.
Morris & Wilkinson, Ltd., Keighley Green Mill, Burnley.
National Gas Engine Company, Ltd., 3, Easy Row, Birmingham.
Nobel Industries, Ltd., Nobel House, Buckingham Gate, S.W.
Parkinson Stove Company, Stechford, Birmingham.
W. C. Panton, 147, Upper Thames Street, London, E.C.
Radiation, Ltd., 18, Bennetts Hill, Birmingham.
Ruston & Hornsby, Ltd., Chamber of Commerce, Birmingham.
Serck Tubes, Ltd., Warwick Road, Birmingham.
Sheringham Daylight Company, 19, Charing Cross Road, W.C.
Spong & Co., Ltd., Woodville Grove, South Tottenham, N.
Tangyes, Ltd., Cornwall Works, Birmingham.
John Thompson, Ltd., Wolverhampton.
Timmis and Co., Stourbridge.

As to the London Section, which is to be held at the White City, attention is drawn to the fact that some of the classes will occupy different halls from those allocated to them previously. Visitors will find the Wood Lane entrance more convenient for the glass section, and the Uxbridge Road entrance for chemicals and scientific and optical instruments.

METROPOLITAN GAS COMPANIES' OFFICIAL TESTINGS.

The Gas Referees' reports of the official testings for the past quarter under the provisions of the Gas Regulation Act give the following average calorific values for the Metropolitan Companies named.

Brentford Gas Company.—501·5 B.Th.U. (declared calorific value, 500 B.Th.U.).

Commercial Gas Company.—480·3 B.Th.U. (declared calorific value, 475 B.Th.U.).

Gas Light and Coke Company.—502·5 B.Th.U. (declared calorific value, 500 B.Th.U.).

South Metropolitan Gas Company.—562·7 B.Th.U. (declared calorific value, 560 B.Th.U.).

South Suburban Gas Company.—501·3 B.Th.U. (declared calorific value, 500 B.Th.U.).

Tottenham District Light, Heat, and Power Company.—502·3 B.Th.U. (declared calorific value, 500 B.Th.U.).

Wandsworth, Wimbledon, and Epsom District Gas Company.—474·6 B.Th.U. (declared calorific value, 470 B.Th.U.).

GAS EXHIBITION AT HALIFAX.

An interesting exhibition of appliances illustrating the uses to which gas can be put was opened by the Mayor, Alderman W. Smith, at the Drill Hall, Halifax, on Thursday, Jan. 14. It has been organized by the Gas Committee, under whose auspices leading manufacturers have arranged stands showing their apparatus. In association there are demonstrations of cooking by gas. There was a large attendance at the opening.

Alderman J. H. WADDINGTON, Chairman of the Gas Committee, who presided, observed that they had promoted the exhibition almost solely to demonstrate that there was no commodity of such value as that supplied by the Gas Committee.

The MAYOR, in declaring the exhibition open, remarked that those who used gas were doing their part to free the town from the smoke nuisance. In Halifax, from coal consumption, there was produced 300 tons of smoke per annum; and if they could do away with that, they could make Halifax a health resort. There was no unemployment in the gas industry. Apart from the men employed in the manufacture and distribution of gas, over 15,000 men and women were employed in the production of the appliances represented in the exhibition. In Halifax, the Gas Committee was the largest ratepayer in the borough. As a working man himself, with a limited income, he was anxious that his fellow workers should spend their money to the best advantage; and he was convinced that the more they used gas, in place of coal, for cooking, washing, and heating, the better and cheaper it would be for them in the long run. People visiting the exhibition would be granted the concession of a 10 p.ct. reduction on their purchases.

In the evening, at the Town Hall, a lecture was given by Dr. E. W. Smith, of London. An abstract of this will be found on p. 145.

Rendering Gas-Works Buildings Attractive.

The problem confronting the Westchester Lighting Company, when it was decided to construct a holder station and boiler and exhauster house at Greenburg, New York, was, says the "American Gas Association Monthly," to provide an attractive building. An ideal lay-out of boilers and equipment was made, which determined the shape and dimensions of the building, and resulted in an irregularly formed structure of 120 ft. frontage by 50 ft. deep at the boiler room end and 35 ft. deep at the other end. The irregular shape of the plan suggested a Gothic structure; and the building was designed in the style of the English Tudor-Gothic period, with arched entrances, mullioned and transomed windows, and cooped gables. In designing this building, the architects carefully followed precedent; consulting the works of authorities and photographs and sketches of existing buildings. Traces are to be found in it of various well-known buildings, but more particularly of Woodsome Hall, in Yorkshire, which has served as the inspiration for the principal façade. The building is of red brick, with reddish brown terra-cotta window, door, and gable trim. The window sashes are of steel, glazed with antique glass; and the doors are of heavy oak plank, with large ornamental wrought-iron hinges. The roof is of copper.

Dunstable Gas and Water Company.—At a special meeting of the Company on Jan. 15, at the Town Hall, a resolution was passed approving the terms of a Draft Provisional Order, under the Gas and Water Works Facilities Act, 1870, and the Gas and Water Works Facilities Act (1870) Amendment Act, 1873, for empowering the Company to raise £15,000 share capital for future developments.

Portsea Island Gas Company.—The Portsea Island Gas Company's output for last year reached 2,428,000,000 c.ft., which represents an increased production of something like 70 p.ct. over the quantity sold in 1910. All previous records were broken by the Christmas Day output, when 10,053,000 c.ft. were consumed in the 24 hours, of which it is computed some 3,140,000 c.ft. were required to cook the Christmas dinner—this representing the output between 11 a.m. and 2 p.m. The Company propose to lay a new 24-in. feeder main from the Hilsea Gas-Works to Eastney, at an estimated cost of £20,000, to meet the growing needs of this district. As an indication of the increasing use of gas for household purposes in the borough, it is interesting to note that during the last three months orders have been placed with the Company for no fewer than 3600 new appliances.

ROYAL COMMISSION ON THE COAL INDUSTRY.

Coalowners' Proposals.

The suggestions of the coalowners for improving the present position of the mining industry of this country were put forward in a memorandum presented to the Royal Commission on the Coal Industry on Tuesday, Jan. 12, on behalf of the Mining Association of Great Britain, by Mr. EVAN WILLIAMS (President) and Mr. W. A. LEE (Secretary). These suggestions, as summed-up by the Chairman of the Commission (Sir Herbert Samuel) were that the miners were to be required to work an additional hour per day without extra remuneration directly for that extra hour; that wages would have to be reduced in the districts, varying from 6d. a week in South Wales to 5s. or 6s. a week in some of the other areas, and rising to over 15s. a week in Lancashire and Cheshire; that the owners would have to effect a reduction of 10 p.ct. in costs other than wages; that railway rates would have to be reduced by 25 p.ct.; that one would have to contemplate the immediate dismissal, even though it might be temporary, of perhaps 100,000 men; and that at the end of all this the industry as a whole would be earning no profits, but would be running at a loss of about 3d. per ton.

The Mining Association, in their memorandum, stated that the problems which the coal mining industry had to face were (1) that the cost of production of coal so greatly exceeded the present selling price that it was impossible for the industry to continue to support the burden; and (2) still further reductions of coal prices were necessary for the regaining of the coal export trade, and for the stimulation of a healthy demand for coal on the part of home industries. The sweeping charges of inefficiency which had been made against the management by those interested in discrediting private enterprise in industry generally could not be substantiated, and were a slander upon the management of an industry which in point of efficiency would compare favourably with that of the coal industry in any other country, or of other industries in this country. Their origin dated from, and was clearly traceable to, the necessities of the political nationalization campaign of the past few years.

DISTRICT AUTONOMY.

In considering the remedies which, in the opinion of the Association, it was necessary to apply, it was desirable to emphasize at the outset that the magnitude of the problem to be met varied greatly from district to district, and that a particular measure would produce very different results in different districts. For this and other reasons it was vitally necessary to restore to the districts the complete autonomy which they possessed before the war in regulating their wages arrangements and conditions of employment. Wide differences existed between the various coalfields in respect of their geographical position, their geological conditions and methods of working, the classes of coal produced, the uses to which these could be put, the demand for which they catered, and a number of other conditions, the result of which was that no common basis existed for a final settlement of mining questions on a national footing.

LONGER HOURS AND REDUCED WAGES.

In considering the general character of the remedies to be applied, the Association had sought to estimate the general level at which coal prices were likely to induce a sufficient volume of trade to produce reasonably continuous employment, and had found that in each district the existing costs of production exceeded the level of prices thus obtained. They had examined the whole of the items which constituted cost of production other than wages, with a view to ascertaining what economies, if any, could be made. They had then directed attention to the possibility of securing a reduction in costs of production through an increase in the rate of output per person, a point in connection with which the question of hours of working was of the utmost importance. Finally, they had found that, after the possibilities of all the foregoing methods had been exhausted, there remained in most districts a difference between costs and prices which could only be eliminated by a reduction in wages.

A general level of coal prices of 20 p.ct. above that of 1913, or approximately 40 p.ct. above the level over the five years 1909-13, was the highest that could be contemplated in the near future. A table was given in which were set out the average prices per ton of coal in the various coal mining districts; and adding 40 p.ct. to the 1909-13 figures, the prices ranged from 11s. 4d. in South Derby to 16s. 9d. in South Wales and Monmouthshire. In arriving at these prices, it had been assumed that the charges for transport and incidental services which the coal had to bear between the pit and the point of consumption would remain constant.

TRANSPORT COSTS.

From the evidence given to the Commission recently by Sir Ralph Wedgwood, on behalf of the four amalgamated groups of railways, it appeared that if the railway wages bill were reduced by an amount which would still leave railway workers with a percentage increase of wages over those of 1913 not less than the present average percentage increase in mine workers' money earnings—namely, 61 p.ct. —all rates on mineral and goods traffic could be reduced by 25 p.ct. The present average railway rate on coal was 3s. 7d. per ton, an increase of 83 p.ct. above 1913. Approximately, a 25 p.ct. reduction in transport and dock charges would result in the reduction in charges of 1s. per ton in the case of the districts included in the Eastern Federated Area, and 9d. per ton in other districts. The Association were of opinion that reductions of this order could, and should, be made.

An examination of costs of production other than wages showed that, apart from savings which could be effected through an increase in the rate of output per person—in general, an increase of one-eighth in the rate of output per person would effect a saving of about 4d. per ton in costs other than wages—no very material reduction could be expected in the near future. Such reductions as could be made could only take place gradually, and it was impossible at this stage to estimate with accuracy their amount. The Mining Association, however, in their figures, had allowed for a reduction under this head of 10 p.ct. as being the possible limit, but this was on the assumption that wages in the sheltered industries were brought into line with those in the unsheltered.

MACHINERY AND PRODUCTION.

The means by which the rate of output per person employed in the industry could be increased involved a variety of considerations, the principal being hours of work, the working of multiple shifts, and the use of mechanical aids to coal production. Multiple shift working was no specific, but, generally speaking, where it was advantageous it had been adopted, except in one or two districts where it was not adopted owing to the opposition of the workmen. The introduction of machinery where advantageous was, and always had been, the policy of the colliery owners. While the scope for the increased use of machinery was definitely limited by physical conditions, it was expected that, given a reasonable prospect of security in the industry, the use of mechanical aids to coal mining would continue to increase, with a consequent increase in output per shift, and reduction in cost.

The economic gap between the existing cost of production and the existing world price could only be substantially bridged by a return to longer working hours. The Mining Association, therefore, urged strongly that the first step to be taken in any sound policy of restoration was a return to the hours of work in operation prior to 1919. Whether or not this was to be regretted from a social standpoint might be a matter of opinion; but hours of work were not finally determined by theories as to social conditions that ought to obtain in any country. Standards of living must rest upon stable economic conditions. They were determined by volume of trade, security of employment, and the amount of earnings that the worker could take home at the end of the week, and their purchasing power. In the last resort the number of hours to be worked was a matter of individual and national necessity. The longer hours worked on the Continent, and the relatively substantially lower wages paid there, were factors that must be reckoned with, and met, if trade was to be secured, employment given, and wages paid.

A return to longer hours of work would not by itself entirely meet the situation, but it supplied a necessary, ready, and self-evident part-solution which no other proposed remedy provided. Such a return to the longer working day would at once confer all-round advantages. It would benefit the worker by securing for him a larger volume of trade, steadier employment, and larger earnings than were possible if existing conditions continued; it would assist towards the industry being placed upon a sound financial basis, which was much more to the advantage of the worker than he generally realized; and further, it would be of enormous advantage to the country as a whole in stimulating the consumption of coal in the large dependent industries, and in steadily increasing the volume of foreign trade.

With regard to the lowering of costs of production by reduction of wages costs, it was essential that in each district the parties should be free to determine by negotiation between employers and employed the nature and amount of the adjustments which it was in the interests of both parties to make. As to Government subvention, freedom from political interference in the economic sphere was a condition essential to the health of industry: and the Association trusted that the earliest opportunity would be sought for the removal of the subvention. The members of the Association were willing, as they always had been, to enter into district negotiations with the miners' representatives, with the utmost goodwill and friendship, and with the single aim to do what was best for the nation and for the industry and all engaged in it.

In a memorandum on the grading of coal, it was pointed out that the British coal trade had been built-up on specialized lines, and the units composing it had catered for particular markets. It was suggested that a system which had in the past proved successful should not be departed from without the most earnest deliberation. A demand had grown up for specified coals, which would lose their identity under grading—thus tending to lessen the known available market for its own products upon which each colliery depended.

The CHAIRMAN said, with regard to the suggestion to increase the working hours, that, if this were adopted, the British miners would be longer underground than those of France, Belgium, and Westphalia.

Mr. WILLIAMS agreed, but pointed out that they would be earning more wages.

The CHAIRMAN remarked that the 1909-13 prices, *plus* 40 p.ct., which it was suggested should be the stabilized prices for the future, would be lower than those received in 1924.

Mr. WILLIAMS replied that the industry could not maintain the 1924 prices, because it would lose its export trade.

The CHAIRMAN remarked that evidence given previously had shown that the level of wholesale prices generally was 73 p.ct. above the 1909-13 level; whereas it was suggested that the price of coal should be 40 p.ct. above the 1909-13 level, which was a very much lower increase.

Mr. WILLIAMS replied that iron and steel prices showed an increase of only 18·5 p.ct.

The CHAIRMAN agreed that this was an important consideration.

Mr. WILLIAMS would not agree that advantage would accrue as the result of compulsory grouping of the 1500 existing concerns, thereby reducing the number to 500. The policy of grouping on a voluntary basis had been pursued, and would be pursued in the future, where it was advantageous. He disagreed with statements which had been made that the present system of privately-owned royalties had a psychological effect upon the men. The workers at the collieries did not concern themselves about the incidence of royalties. Some collieries had been considering schemes whereby they could interest the men more closely in the success of the concerns in which they were employed, by giving them a financial interest in those concerns. The owners held the view very strongly indeed that it was eminently desirable as far as possible thus to interest the men. It would be impossible, however, to lay down any line which would be generally acceptable throughout the industry.

FITTERS' SCHOOL OF INSTRUCTION.

An interesting outline of a scheme devised by the Brooklyn Union Gas Company for the purpose of instructing employees engaged in work which takes them to the premises of consumers has been given by Mr. George Kirchmer in the pages of the "American Gas Association Monthly." It takes the form of a Fitters' School of Instruction, in which an attempt has been made to reproduce any faulty conditions of gas supply that may actually be found on the district.

There is on the main floor of the building all the piping required for an apartment house containing twenty rooms, each with three points for lighting and one for a stove. Though space considerations required a rather cramped arrangement of details, the equipment for each apartment is kept separate, and each is numbered. The supply piping for fourteen of the apartments is led through a room known as the "trap room." Two gas services enter this room on one side; and provision is made to introduce water into these services, thus affecting the supply of gas that comes from each service. A trapped service will naturally cause trouble in each apartment supplied by it, while trapped house-piping will only affect the particular apartment in question, or possibly but one or two outlets. In the trap room and the piping adjacent to it are provided the means for trapping either of two services or any one or more of the fourteen apartments the piping of which passes through the trap room. It is also possible for the instructor to cause the house-piping to leak. This is done by opening stopcocks a pre-determined amount. This leaking gas passes into a pipe which leads to the roof of the building.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Jan.* 18.

The market for pitch continues steady, and the price is firm at 58s. to 59s. per ton f.o.b. There are inquiries being made in some directions for next season's delivery; but makers are disinclined to offer so far ahead at the moment.

Creosote is steady at about 7¼d. per gallon net, in bulk, at makers' works.

Pure benzole and pure toluole are firm at about 2s. 2d. per gallon, 95/160 solvent naphtha at 1s. 10d. per gallon.

Pyridine, 90/140, is steady at about 19s. 6d. per gallon.

Tar Products in the Provinces.

Jan. 18.

Markets remain steady. In pitch, a fair amount of business is reported at round about market prices, although there is some hesitation on the part of buyers to book very far ahead.

Creosote is still firm, with a good demand for home and export. Benzole is very firm, and any available parcels realize good prices.

Solvent naphtha is steady, and full prices are being paid for forward contracts to June. Heavy naphtha is neglected. Cresylic acid is in good demand, especially for the best qualities.

Very little business is doing in naphthalene and anthracene.

The average values for gas-works products during the week were: Gas-works coal tar, 39s. to 44s. Pitch, East Coast, 56s. to 58s. f.o.b. West Coast—Manchester, 50s. to 52s. 6d.; Liverpool, 51s. to 53s.; Clyde, 54s. to 55s. Benzole, 90 p.ct. North, 1s. 8½d. to 1s. 9½d.; crude, 65 p.ct., at 120° C., 1s. 1d. to 1s. 2d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 8½d. to 1s. 9½d. Toluole, naked, North, 1s. 8d. to 1s. 9d., nominal. Coal-tar crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 7½d. to 1s. 8½d. Heavy naphtha, North, 11½d. to 1s. 0½d. Creosote, in bulk, North, liquid, 6½d. to 6¾d.; salty, 6d. to 6¼d.; Scotland, 5¾d. to 6d. Heavy oils, in bulk, North, 6¾d. to 7d. Carbolic acid, 1s. 4d. to 1s. 5d. prompt. Naphthalene, £11 to £14; salts, £4 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

CONTRACTS OPEN.

Tar (Prepared).

Tenders are invited by the Morecambe Gas-Works for prepared tar. [See advert. on p. 169.]

Tar.

The Directors of the Slough Gas and Coke Company are inviting tenders for their surplus tar for one year. [See advert. on p. 168.]

Livesey Washer.

Tenders are invited by the Gas Committee of the Congleton Corporation for the supply of a Livesey washer. [See advert. on p. 168.]

Cast-Iron Pipes and Specials.

The Town Council of Middleton are inviting tenders for the supply of 6-in. and 4-in. cast-iron pipes and specials. [See advert. on p. 169.]

Retort House and Condenser.

The Gas Commissioners of the Burgh of Dunbar are inviting tenders for the erection of a complete retort house and a water-tube condenser. [See advert. on p. 168.]

Conway Gas Supply.—At a recent meeting of the Conway Town Council definite steps were taken with regard to the proposed removal of the gas-works and re-erection on modern lines on the Morfa, where access to the railway by means of the existing siding may be obtained. The question of whether a satisfactory foundation for the buildings can be found there will be settled by borings. All coal used at the present works has to be carted from the railway station through the congested main street of the town. Moreover, the site of the present works is too restricted for the plant to be adequately enlarged. Mr. Newbigging, Consulting Gas Engineer, has prepared a scheme for a new works; and this was accepted by the Council, subject to the site on the Morfa being approved as suitable.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

The market remains distinctly firm, with very little good coal unsold for this month, and satisfactory inquiry coming forward for February. Prices do not show much alteration, but are inclined to harden in some cases. This is noticeable in gas coals, which have been in good demand all round.

Several collieries which have been idle for some time have resumed, or are resuming, work, which is an indication of the better market conditions prevailing. Settlements have, in some cases, been facilitated by the more elastic arrangements now permitted by the Durham Miners' Association.

Quotations for gas coals are 17s. 6d. to 18s. f.o.b. for Wear Specials, and 16s. 9d. for best qualities. Seconds are called 15s. 9d. to 16s. Durham unscreened coking is 15s. 6d. to 15s. 9d., and bunkers are in good demand at about 16s. 9d. for best sorts.

An interesting feature has been the shipment of coke to America, in connection with the strike of anthracite miners. Gas coke remains in very good demand, and strong at 24s. 6d. to 25s. 6d. f.o.b.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

The recent wintry weather has caused domestic coal to be in rather better request, much more so than last week, when there was a lull in the activities which had prevailed before Christmas. Prices locally appear to be steady; but there are indications that the Metropolitan area is prepared to meet the situation by increases.

The industrial situation is not such as to warrant the optimistic feeling of a better state of affairs which prevailed in certain quarters some time ago. Some of the larger of the chief consuming concerns are accumulating slight stocks; but this is not general.

In the gas industry there appears to be an inclination to purchase ahead of existing contracts, which suggests that it is not anticipated there will be any reduction in prices after the report of the Coal Commission is available.

The export market is firm, especially for the better grades.

The following are the Humber bunker and export prices (f.o.b. shipping ports): South Yorkshire—Hards, Association, 21s.; screened gas coal, 20s. 6d.; washed doubles, 19s. 6d. to 20s.; washed singles, 18s. to 18s. 3d.; washed smalls, 14s. 6d. to 14s. 9d.; rough slack, 10s. 4½d.; smithy peas, 19s. 6d. West Yorkshire—Hartleys (f.o.b. Goole), 18s. to 18s. 6d.; washed doubles, 18s. 3d. to 18s. 6d.; washed singles, 17s. 6d.; washed smalls, 14s. to 14s. 6d.; unwashed doubles, 14s. 6d.; rough slack, 10s. 6d.; coking smalls, 10s. Derbyshire and Nottinghamshire—Top hards, 20s. 6d. to 21s.; washed smalls, 14s.; rough slack, 10s. 3d. to 10s. 6d. Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, 18s. to 19s.; gas coke, 24s. 6d. to 26s.; furnace coke, 20s. to 21s. per ton.

COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

Disorganization arising from insufficient railway transport is still the plague of the coal trade. Merchants are now getting supplies rushed into wharves and sidings faster than they can be carted out or absorbed. The gas undertakings, or at any rate the larger concerns, are much behind their contract averages. They betray no anxiety to overtake arrears, for the congestion of stocks has been a contributory cause. Collieries which supply locomotive coal are by no means well pleased with the concessions they have had to make to the railways, amounting to 3s. 6d. or 4s. as compared with last year's contract rates. They will continue to press for some return in cheaper and better transport facilities. There is no appreciable improvement in the demand for industrial fuel. The trades which are opening the year propitiously are not the large fuel users. In the basic trades no new stimulus is apparent.

Production costs at the blast furnaces have reached a point which dictates safety tactics on the part of smelters, particularly in view of the unsettlement in the coalfields. Expansion of output is discouraged. Though stocks have been depleted, consumers are very chary about committing themselves at the enhanced prices demanded for pig iron. Furnace coke is up about 1s. 6d. on last quarter's scale.

TRADE NOTE.

Prestatyn Extensions.

Messrs. Robert Dempster & Sons, Ltd., of Elland, have secured the contract for the whole of the work involved in extensions at the gas-works of the Prestatyn Urban District Council.

Gas Oil.—In the London market report of the "Petroleum Times" last Saturday, it was stated that the price of gas oil was advanced on the 9th inst. to 5¼d. per gallon, net and naked, *ex* wharf.

Gas Matters at Bala.—Dealing with a complaint respecting the gas supply in the Bala Urban District Council last week, Mr. J. W. Jones (the Chairman of the Gas Committee) explained that the quantity of gas produced was in excess of that made when the Council took over the works. The output for the year was between 5 and 6 million c.ft.; and he thought they were doing very well. The Committee were carefully considering the matter, and an expert had inspected the works. Two things were known—that the gas was too good and also too cheap. The Council's main difficulty was lack of money. As soon as the report of the expert was received, the whole matter would be examined thoroughly.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Jan. 13.]

Nos. 139-729.

BOWATER, N. J.—"Manufacture of gas." No. 655.
CUTHBERT, D. A.—"Device for igniting gas jets." No. 453.
DAVIES, G.—See Cuthbert, D. A. No. 453.
GIBB, D. M.—"Gas taps, &c." No. 312.
GJUKE, G. E.—"Gas-fired boiler for heating." No. 167.
HEYL, G. E.—"Distillation and transport of oils and tar." No. 493.
HUMPHREYS & GLASGOW, LTD.—"Generation and distribution of gas." No. 516.
KOHLENVEREDLUNG GES.—"Retorts." No. 422.
LAING, B.—"Manufacture of water gas." No. 446.
MITCHELL, J.—"Gas burner." No. 577.
NIELSEN, H.—See Laing, B. No. 446.
PARKINSON STOVE CO., LTD.—See Gibb, D. M. No. 312.
SCHWARTZ, C.—"Coke cooling plant." No. 315.
WEYGANG, C.—"Method of treating tar, &c." No. 499.
WILTON, T. O.—"Treatment of effluent liquor." No. 410.

A New Blotting Pad.—We have to thank Messrs. Mobberley & Perry, Ltd., of Stourbridge, for a new blotting pad, with, on the left-hand side, a book diary for the year.

Pension Scheme at Truro.—The Truro Gas Company brought into operation on the 1st inst. a contributory pension scheme under the terms of which all members of the regular staff will be secured a pension at the age of 65.

Swadlincote Gas Undertaking.—The position of the gas-works was discussed at a meeting of the Swadlincote Urban District Council, when Mr. E. W. Goodhead (Chairman of the Gas Committee) said that for years they had had difficulties, and that since the war these had been greater. They had been "saddled with a scrapheap" as regards the carbonizing plant, and had spent considerable sums of money on both the apparatus and the mains. He had expressed the opinion from time to time that if they were to get the most out of the works, they must have good plant and efficient management. In the past they experienced trouble in maintaining the calorific standard of the gas; and, in conjunction with this, their finances had become worse. They called in Mr. J. Ferguson Bell, of Derby, and his report confirmed his (the speaker's) fears. They had to decide upon a policy; but the Committee did not agree to what he conceived to be the only right policy, and he felt he had no other course open to him but to resign from the Chairmanship of the Committee. At a subsequent meeting of the Gas Committee Mr. L. Gregson was appointed as Chairman.

On Jan. 16 the daily list of donations to the Leeds University Extension Appeal Fund included a gift of twenty-five guineas from the Coke Oven Managers' Association.

The Greenock Corporation Law and Finance Committee have decided to instal new plant at the Inchgreen Gas-Works, at a cost of between £7000 and £8000. The new plant will increase the output from two to four million c.ft. per day.

On Monday night, Jan. 11, there was a failure of the gas supply at Brigg, which, however, was remedied early the following day. At lighting-up time, it was found that the pressure was inadequate to meet requirements, and the announcement was made that there was a stoppage in the mains.

At a recent meeting of the Horncastle Urban Council, the situation in regard to the gas undertaking, which is £8000 in debt, was discussed; and a letter from the Ministry of Health was read, saying that the Board of Trade were unable to grant a further loan. It was arranged that the Clerk should interview the Board of Trade.

Sentenced to three months' hard labour, at Halifax, for stealing 7s. 4d. from a slot gas meter on the premises of his late employer, David Bardsley pleaded guilty, but put the blame on a former Court for having sentenced him for an offence of which he was innocent. Bardsley disappeared after robbing the meter, but later gave himself up.

At Clitheroe, on Jan. 14, Alderman Thornber, in reply to Mr. J. S. Hitchon, who asked if contemplated extensions at the gas-works were necessary in view of the advent of electricity, said the experience of other towns was that the consumption of gas tended to increase in spite of the availability of electricity. In any event, alterations were necessary, as the plant needed modernizing.

A new scheme of allowances for employees who are getting past work has been sanctioned by the Walsall Gas Committee, and submitted to the men for their consideration. Aiming at increasing the grant to workmen who have done long service, and lessening the amounts for those who have worked for shorter periods, the scheme is estimated to cost the department £800 per annum, which is stated to be very little more than the aggregate of the allowances of 10s. a week now being made.

Replying in the Birkenhead Town Council to Mr. Platt, Mr. Luke Lees (the Chairman of the Gas Committee) said that during December 4640 complaints were received from gas consumers by the Gas Department at the various branches, as compared with 3626 during the corresponding month of the previous year, and 750 between Jan. 1 and Jan. 9 this year, as against 650 between those dates a year ago. The number of consumers had greatly increased; and the cause of many of the complaints of lack of pressure was due to the pipes, which were decayed and rotten. The condition of gas stoves sent to the department for cleaning led them to wonder how the householders had had any gas at all. For the most part they were filthy. The department were dealing with the complaints as rapidly as possible.

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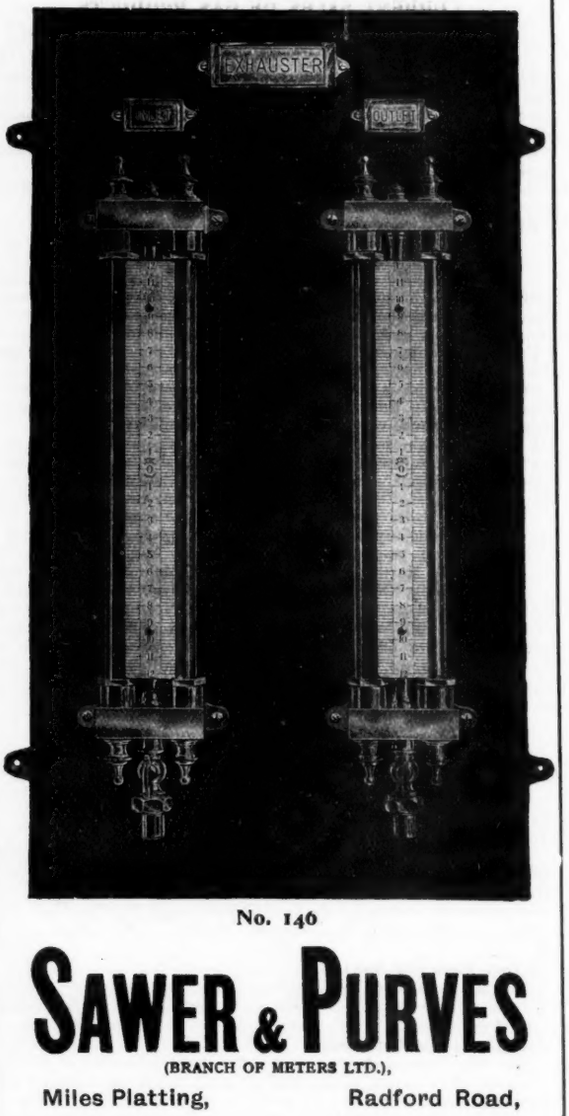

No. 146

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STOCK MARKET REPORT.

BUSINESS on the Stock Exchange was distinctly dull during the greater part of last week; and several new issues were largely left with the underwriters, including portions of the two Colonial loans. The uncertainty of the labour situation, especially with regard to the miners, is another factor which is tending, and will tend, to depress prices. In other respects the prospects are hopeful.

Following the excellent results of the "big five" banks for the past year, the accounts of the Industrial companies show material improvements. Gilt-edged stocks were steady, but with little business doing except in Funding Loan, presumably on behalf of the sinking fund. Rubbers, on the continued fall in the price of the commodity, were again depressed, but there are very few of the better-class shares in the market.

Gas Stocks may be described as beating time; and in view of the prominence and advertisement which at the present time the competitive commodity, electricity, is getting by reason of the proposed Government measure, it is perhaps not surprising. Inquiries of the undertakings, however, show that the results of the past year, in spite of the slump in residuals, have been excellent, and administrators are very optimistic.

The feature of the week was the rise of 10½ points in the East Hull ordinary 5 p.ct. stock to 88—91. It will be seen that there were several other improvements in the quotations, but these were more in the nature of *cum* div. increases. On the other hand, South Shields consolidated and Tottenham "B" 3½ p.ct. dropped 2½ and 2 points respectively.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 70¾, Bournemouth 5 p.ct. 12⅝, 12½, 7 p.ct. "B" 12¼, Brighton and Hove "A" 139, Croydon sliding-scale 99, 99¾, Gas Light and Coke 86½, 86⅜, 87¼, 4 p.ct. preference 77⅛, 77⅜, Imperial Continental 135, 135¼, 136, 137, Malta and Mediterranean 4 1/16, 5, Montevideo 69¾, 70½, Primitiva 12s. 10¼d., 13s., 13s. 3d., South Metropolitan 94½, 95, South Suburban 100, 100½, 5 p.ct. debenture 96¼. Supplementary prices, Colonial 20s. 9d., 21s., Croydon 4 p.ct. debenture 73, 74.

On Tuesday, Bombay 19s., Bournemouth 5 p.ct. 12⅝, "B" 12¼, 6 p.ct. preference 11¼, Brighton and Hove "A" 139, British 106¼, Continental Union 7 p.ct. preference 90, 90½, European 6, 6 1/16, Gas Light and Coke 86½, 86⅝, 87⅛, 87¼, 3½ p.ct. maximum 61½, Imperial Continental 135, 136¼, 3½ p.ct. debenture 71½, Primitiva 12s. 9d., 13s. 3d., South Metropolitan 94½, 94⅞, 95, 95¼, 6½ p.ct. debenture 104½, 105, South Suburban 5 p.ct. 101½, 5 p.ct. debenture 95⅞, 96¼, Swansea 6½ p.ct. debenture 100¼, Wandsworth (Wimbledon Stock) 106. Supplementary prices, Southend-on-Sea 5 p.ct. new "B" 81¼, 82, Sutton 106½.

On Wednesday, Alliance and Dublin 70, Bombay 18s., British 7 p.ct. preference 119½, 120 *ex* div., Commercial 4 p.ct. 83, European 6⅛, Gas Light and Coke 86½, 86⅜, 86⅞, 87, 87⅛, 4 p.ct. preference 77¼, 3 p.ct. debenture 58⅜, 58¾, 59¼, 59⅜, Hongkong and China 20¾, Imperial Continental 134¼, 136, Lea Bridge 98½, 99, Primitiva 12s. 9d., 12s. 10¼d., 13s., South Metropolitan 94⅜, 95½, South Suburban 101, 101¼. Supplementary prices, Horley District "A" 120.

On Thursday, Aldershot 4 p.ct. preference 71, 71½, Alliance and Dublin 70⅜, Bombay 18s. 9d., Bournemouth 6 p.ct. preference 11½, Brighton and Hove 173½, 174, 174½, 175, Commercial 4 p.ct. 83½, Gas Light and Coke 86½, 86⅜, 86⅝, 87⅛, 4 p.ct. preference 78½, 3 p.ct. debenture 58¼, 58⅜, 59½, Imperial Continental 136, 3½ p.ct. debenture 72, Liverpool 7 p.ct. preference 102½, Primitiva 12s. 9d., 13s., 4 p.ct. (Buenos Ayres) debenture 65, South Metropolitan 94⅜, 95, 95¼, South Suburban 5 p.ct. 100, 101½, 5 p.ct. debenture 94½, Tuscan 6 p.ct. debenture 73, Wandsworth (Wimbledon Stock) 104. Supplementary prices, Grays and Tilbury "B" 8½, Hampton Court 5 p.ct. 101½, Southend-on-Sea 5 p.ct. 85, 5 p.ct. "B" 81, 4 p.ct. debenture 71.

On Friday, Alliance and Dublin 70 1/16, 70¾, Brighton "A" 139, Commercial 3½ p.ct. 82, 3 p.ct. debenture 56, Gas Light and Coke 86½, 86⅜, 87, 3½ p.ct. maximum 60½, 61, 61½, 4 p.ct. preference 79, 3 p.ct. debenture 58¼, Imperial Continental 135, 135½, 136½, Liverpool 7 p.ct. preference 103¾, Montevideo 70, 71, Primitiva 12s. 10¼d., 13s. 1½d., 4 p.ct. (Buenos Ayres) debenture 64½, 65¼, 65½, 66, South Suburban 5 p.ct. 101½. Supplementary prices, Pinner 6 p.ct. preference 5½, Southend-on-Sea 5 p.ct. 86, 5 p.ct. "B" 82, 4 p.ct. debentures 72.

Money was exceedingly tight during the early part of the week; but the position eased towards the close, and with the favourable Bank Return the position is much more stable. Old day-to-day loans were generally renewed at 4 p.ct., but balances were finally offered at as low as 3 p.ct. The rate at which Treasury Bills were allotted was lower, at £4 16s. 7·85d. p.ct.

Sterling was again firmer, and the rate finally closed at 4.86 3/32. French francs rallied, the Paris rate being 128½. Belgian francs were cheaper at 107.02½; but the Italian lire dropped to 120.30.

There were no supplies of Gold available, the price remaining nominally at 84s. 11d. per oz. Silver, with both India and China offering, was dull, and the cash price fell to 31 5/16d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3¼ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Jan. 15.	Rise or Fall.	Transactions Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Aug. 13	5	5	Aldershot 5 p.c. max. C.	75—78	..	..
322,992	,,	,,	4	4	Do. 4 p.c. Pref.	70—75	..	71—71½
1,551,868	,,	Oct. 8	6¼	6¼	Alliance & Dublin Ord.	68—72	..	70—70¾
374,000	,,	Jan. 7	4	4	Do. 4 p.c. Deb.	58—63*	..	..
300,000	1	Oct. 22	1/7⅗	1/7⅗	Bombay, Ltd.	7/6—1	..	18/—19/-
170,000	10	Aug. 13	8½	8½	Bournemouth 5 p.c.	12—13	..	12⅛—12⅝
425,050	10	,,	7	7	Do. B 7 p.c.	12—12½	..	12¼
150,000	10	,,	6	6	Do. Pref. 6 p.c.	11—12	..	11¼—11½
50,000	Stk.	Jan. 7	3	3	Do. 3 p.c. Deb.	55—58*	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	75—78*	..	..
214,740	,,	Aug. 27	12½	12	Brighton & Hove Orig.	172—177	+2	173½—175
244,200	,,	,,	9½	9	Do. A Ord.	137—142	..	139
1,287,500	,,	July 23	5	5	Bristol 5 p.c. max.	89—91*a*	..	..
855,000	,,	Oct. 8	7	8	British Ord.	105—110	..	106¼
100,000	,,	Jan. 7	7	7	Do. 7 p.c. Pref.	117—122*	..	119½—120
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	69—74*	..	..
100,000	10	Dec. 17	8	6	Cape Town, Ltd.	6¼—7⅛	..	..
100,000	10	Nov. 5	4½	4½	Do. 4½ p.c. Pref.	6¼—6⅝	..	..
150,000	Stk.	Jan. 7	4½	4½	Do. 4½ p.c. Deb.	68—73*	..	..
626,860	,,	July 23	6	6	Cardiff Con. Ord.	98—101	..	..
237,860	,,	Jan. 7	7½	7½	Do. 7½ p.c. Red. Deb.	98—101*	..	..
167,150	,,	Aug. 13	6½	5	Chester 5 p.c. Ord.	90—95*b*	..	..
79,185	1	Oct. 8	—	2/-	Colombo Ltd. Ord.	25/—27/-	..	..
24,500	1	,,	—	1/4½	Do. 7 p.c. Pref.	21/—23/-	..	..
1,513,280	Stk.	July 23	5/14/8	5¼	Commercial 4 p.c. Cap.	82—87	..	83—83½
560,000	,,	,,	5⅛	5/8/4	Do. 3½ p.c. Cap.	82—87	..	82
475,000	,,	Dec. 17	3	3	Do. 3 p.c. Deb.	55—58	..	56
800,000	,,	Oct. 8	—	4	Continental Union, Ltd.	35—40	..	..
200,000	,,	,,	7	7	Do. 7 p.c. Pref.	88—91	..	90—90½
660,000	,,	Aug. 13	6½	6½	Croydon sliding scale	97—101	..	99—99¾
284,975	,,	,,	5	5	Do. max. div.	81—84	..	..
492,270	,,	Aug. 13	9	6	Derby Con.	107—109*c*	..	..
55,000	,,	Dec. 17	4	4	Do. Deb.	74—76*c*	..	..
209,000	,,	Sept. 10	5	5	East Hull Ord. 5 p.c.	88—91	+10½	..
50,000	,,	Dec. 17	—	5	Eastbourne 5 p.c. Deb.	93—98	..	..
1,002,180	10	July 23	4	6	European, Ltd.	5⅞—6⅞	-¼	6—6⅛
16,460,070	Stk.	Aug. 13	5½	5½	Gas Light & Coke 4 p.c. Ord.	85¼—87½	..	86½—87½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	60—63	..	60¾—61½
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	77—80	..	77¾—79
4,761,980	,,	Dec. 17	3	3	Do. 3 p.c. Con. Deb.	58—61*	..	58¾—59⅜
130,000	,,	—	10	10	Do. 10 p.c. Bonds	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Sept. 10	6⅔	6⅔	Hastings & St L. 5 p.c. Conv.	90—95	..	..
258,740	,,	,,	5⅓	5⅓	Do. 3½ p.c. Conv.	71—76	..	..
70,000	10	Sept. 24	10	10	Hongkong & China, Ltd.	19⅛—20½	..	20½
86,600	Stk.	Aug. 13	10	10	Hornsey 7 p.c.	132—137	..	..
1,976,000	,,	Nov. 19	59	10	Imperial Continental Cap.	133—138	..	135—137
226,170	,,	Aug. 13	3½	3½	Do. 3½ p.c. Red. Deb.	70—73	..	71½—72
235,242	,,	Aug. 13	6½	6½	Lea Bridge 5 p.c. Ord.	97—102	..	98½—99
2,127,340	,,	Aug. 13	5½	5½	Liverpool 5 p.c. Ord.	84—84½*b*	+1½	83½—84
600,000	,,	Sept. 24	7	7	Do. 7 p.c. Red. Pref.	103—105*b*	+1½	102½—103½
165,736	,,	Aug. 27	8	9	Maidstone 5 p.c. Cap.	118—128	..	..
63,480	,,	Dec. 17	3	3 7/20	Do. 3 p.c. Deb.	54—59	..	..
75,000	5	Dec. 3	7	6	Malta & Mediterranean	4¼—5	..	4 15/16—5
541,920	Stk.	Nov. 19	4	4	Montevideo, Ltd.	69—73	+1	69⅞—71
2,061,315	,,	Aug. 13	5	5	Newcastle & Gateshead Con.	70—71*d*	+½	70½
300,929	,,	,,	4	4	Do. 4 p.c. Pref.	75½—76½*d*	..	..
529,705	,,	Dec. 17	3½	3½	Do. 3½ p.c. Deb.	66½—67½*d**	..	..
15,000	,,	Aug. 27	12	11½	North Middlesex 10 p.c.	160—170	..	..
75,940	,,	,,	8⅝	8 7/10	Do. 7 p.c.	115—120	..	..
300,000	Stk.	Dec. 3	7	9	Oriental, Ltd.	98—103	..	..
188,120	,,	Jan. 7	7⅞	7⅞	Plym'th & Ston'house 5 p.c.	110—115*	..	..
60,000	50	Aug. 27	14	14	Portsea Island B	93—96	..	..
100,000	50	,,	13	13	Do. C	90—95	..	..
2,289,909	1	—	—	—	Primitiva Ord.	12/6—13/6	..	12/9—13/3
302,600	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	82—84	..	..
600,000	tk.	July 23	4	4	Do. 4 p.c. Red. Deb. 1911	64—66	..	..
193,744	,,	Dec. 17	4	4	Do. B. Aires 4 p.c. Rd. Db.	64—66	..	64½—66
264,496	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	64—66	..	..
150,000	10	Sept. 24	6	6	San Paulo 6 p.c. Pref.	7⅞—8	..	..
125,000	50	Jan. 4	5	5	Do. 5 p.c. Red. Deb.	40—43*	..	..
270,000	Stk.	Aug. 27	5⅓	5⅓	Sheffield A	99—101*e*	..	..
419,968	,,	,,	5⅓	5⅓	Do. B	99—100*e*	..	..
1,047,000	,,	,,	5⅓	5⅓	Do. C	99—100*e*	..	..
90,000	10	June 11	6	4	South African	5—7	..	..
6,609,895	Stk.	Aug. 13	6½	5	South Met. Ord.	94—96	+½	94½—95½
1,895,445	,,	Jan. 7	3	3	Do. 3 p.c. Deb.	56—59*	..	..
734,000	,,	Sept. 10	6½	6½	Do. 6½ p.c. Red. Db.	103—105	..	104½—105
91,500	,,	Aug. 13	8½	8½	South Shields Con.	124—126*d*	-2½	..
1,187,795	,,	July 23	6½	6½	South Suburban Ord. 5 p.c.	99—103	..	100—101½
368,837	,,	Dec. 17	5	5	Do. 5 p.c. Deb.	94—97	+1	94½—96¼
647,740	,,	Oct. 22	5	5	South'mpton Ord. 5 p.c. max.	78—81	..	..
121,275	,,	Jan. 7	4	4	Do. 4 p.c. Deb.	69—74*	..	..
250,000	,,	Aug. 27	7	7	Swansea 7 p.c. Red. Pref.	101—103	..	..
200,000	,,	Dec. 17	6½	6½	Do. 6½ p.c. Red. Deb.	100—102	..	100¼
120,000	,,	July 23	8	7½	Tottenham District A 5 p.c.	110—115	..	..
882,275	,,	,,	6½	5½	Do. B 3½ p.c.	88—93	-2	..
150,000	,,	July 9	—	28/4	Do. 5½ p.c. Pref.	108—105	..	..
181,255	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	74—77	..	..
258,251	,,	Aug. 27	5	5	Tynemouth Con. and New	70½—71*d*	+¾	70½
197,294	,,	Aug. 27	6⅞	6⅝	Uxbridge, Maidenhead, & Wycombe 5 p.c.	93—98	..	..
88,330	,,	,,	5	5	Do. 5 p.c. pref.	93—98	..	..
91,800	,,	,,	6⅞	6⅝	Do. 5 p.c. Maidenh'd	88—93	..	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	July 9	9½	8½	Wandsworth A 5 p.c.	128—133	..	..
255,636	,,	,,	7½	7	Do. B 3½ p.c.	109—114	..	..
392,955	,,	,,	6/9/6	5/19/0	Do. C and New	92—97	..	..
352,000	,,	,,	7½	6½	Wimbledon 5 p.c.	103—108	..	104—106
98,000	,,	,,	7¼	7¼	Epsom 5 p.c.	113—118	..	..
88,416	,,	Jan. 7	3	3	3 p.c. Deb.	55—58*	..	..

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *Ex. div.

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CONTRACTS OPEN.

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(GAS DEPARTMENT.)

THE Gas Committee of the above Council invite TENDERS for the Supply and Erection, at their Gas-Works, Congleton, of:—
One 1,000,000 c.ft. per day LIVESEY WASHER, with Bye-Pass and Valves Complete.
Further particulars can be obtained from the undersigned.
Tenders, endorsed "Washer," to be addressed to The Chairman of the Gas Committee, Town Clerk's Office, Congleton, and must be Delivered on or before the 6th of February, 1926.
The Committee do not bind themselves to accept the lowest or any Tender.

W. A. CARTLIDGE,
Engineer and Manager.

Gas-Works, Congleton,
Jan. 15, 1926.

SLOUGH GAS AND COKE COMPANY.

THE Directors of this Company invite TENDERS for Surplus TAR (crude) for One Year. The estimated quantity for Sale is 55,000 Gallons. The Company have a Railway Siding connecting their Works with the Great Western Railway, and the Grand Junction Canal has a Wharf close to the Works. Price to be quoted at the Company's Works.
The Directors do not bind themselves to accept the highest or any Tender.
Tenders to be Delivered to me not later than Monday, the 25th of January.

ARTHUR THOMAS,
Secretary.

46a, High Street, Slough,
Jan. 14, 1926.

BURGH OF DUNBAR.
(GAS DEPARTMENT.)

THE Gas Commissioners invite Tenders for the Supply and Erection of the undernoted Plant at their Gas-Works.
Complete RETORT HOUSE.
WATER TUBE CONDENSER.
Specifications and further Information may be obtained on Application to Mr. Thomas O'Neill, Manager, Gas-Works, Dunbar.
Sealed Tenders, addressed to the undernoted and endorsed with the name of the Plant tendered for, to be Delivered on or before the 1st of February 1926.
The Gas Commissioners do not bind themselves to accept the lowest or any Tender.

JOHN D. BROOKE,
Town Clerk.

Town Clerk's Office, Dunbar,
Jan. 15, 1926.

CONTRACTS OPEN.—*Continued.*

BOROUGH OF MIDDLETON.

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THE Town Council invite Tenders for the Supply of 500 Yards of 6-inch CAST-IRON SOCKET and SPIGOT PIPES, with Turned and Bored Joints, also SPECIALS; and also 500 Yards of 4-inch CAST-IRON SOCKET and SPIGOT PIPES, both in 12 feet Lengths.

Full Particulars may be obtained on Application to the Engineer, Gas-Works, Middleton, Lancs.

Preference will be given to Firms on the King's Roll: but the Corporation do not bind themselves to accept the lowest or any Tender.

Sealed Tenders, endorsed "Cast-Iron Pipes," must be Delivered to the undersigned not later than Wednesday, Jan. 27, 1926.

J. P. WALMSLEY,
Town Clerk.

Town Hall,
Middleton, Lancs.,
Jan. 18, 1926.

TENDERS are invited, addressed to the undersigned, to be received not later than first post on Jan. 25, 1926, for 19,000 galls. (more or less) of PREPARED TAR to either Nos. 1 or 2 Roads Department Specification as desired, and to be delivered in barrels (returnable) at the Gas-Works Sidings on or before April 10, 1926.

THOMAS W. BARRATT, A.M.I.C.E.,
Engineer and Manager.

Gas-Works,
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Full Particulars regarding Price, and where Situated, to No. 7626, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

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COMPANY NOTICES.

SOUTH SUBURBAN GAS COMPANY.

NOTICE is Hereby Given that the TRANSFER BOOKS relating to the 5 PER CENT. ORDINARY STOCK of this Company WILL BE CLOSED from the 29th day of January to the 26th day of February, both days inclusive.

By order of the Board,
WILFRID WASTELL,
Secretary.

Head Offices:
Lower Sydenham, S.E. 26,
Jan. 20, 1926.

THE GAS LIGHT AND COKE COMPANY.

NOTICE is Hereby Given that an ORDINARY GENERAL MEETING of the Proprietors of The Gas Light and Coke Company will be held at the Chief Office of the Company, Horseferry Road, Westminster, S.W. 1, on Friday, the 5th day of February next, at 12 o'clock (noon) precisely, to transact the usual Business, including the Declaration of a Dividend for the Half-Year ended on the 31st day of December last, and to Elect Directors and Auditors in the place of those who will at such Meeting go out of Office in compliance with the Company's Acts or Schemes of Amalgamation.

By order,
WILLIAM LYLE GALBRAITH,
Secretary.

Chief Office,
Horseferry Road,
Westminster, S.W. 1,
Jan. 18, 1926.

THE GAS LIGHT AND COKE COMPANY.

NOTICE is Hereby Further Given that an EXTRAORDINARY MEETING of the Proprietors of the above Company will be held at the Chief Office of the Company, Horseferry Road, Westminster, S.W. 1, on Friday, the 5th day of February next, approximately at 12.30 o'clock in the afternoon, but in any case immediately after the Ordinary General Meeting to be held at the said Office at 12 o'clock (noon) on that day. At such Extraordinary Meeting a Resolution or Resolutions will be proposed sanctioning the Raising of Additional Money by the creation and issue of Debenture Stock under and in accordance with the powers conferred by the Company's Acts of 1903, 1918, and 1925, and the Acts incorporated therewith.

By order,
WILLIAM LYLE GALBRAITH,
Secretary.

Chief Office,
Horseferry Road,
Westminster, S.W. 1,
Jan. 18, 1926.

THE GAS LIGHT AND COKE COMPANY.

NOTICE is Hereby Given that an EXTRAORDINARY MEETING of the Proprietors of The Gas Light and Coke Company will be held at the Chief Office of the Company, Horseferry Road, Westminster, S.W. 1, on Friday, the 5th day of February next, approximately at 12.45 o'clock in the afternoon, but in any case immediately after the business of the other Extraordinary Meeting of the Company convened for 12.30 o'clock in the afternoon of that day shall have been concluded, for the purpose of considering the provisions of the Bill now before Parliament intituled "A Bill to Confer Additional Borrowing Powers upon the Gas Light and Coke Company, and for other purposes."

At such first-mentioned Extraordinary Meeting, the said Bill will be submitted for the consideration and approval of the proprietors.

Dated this 18th day of January, 1926.

WILLIAM LYLE GALBRAITH,
Secretary of the Company.

Chief Office:
Horseferry Road,
Westminster, S.W. 1.

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AND

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Dr. W. B. DAVIDSON.

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